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ABSTRACT

A summary of the findings of the Committee on Expanded Health Professions Education and recommendations from that committee to the president of the University of Missouri are presented. Eight recommendations are listed, including: (1) that there should be initiated and maintained a program to provide factual information on the availability of health care services, (2) that there be a greatly improved and increased effort to identify and recruit minority and rural students, and (3) that educators of the University of Missouri pay more attention to the concept of the integrated team approach to health care. An introductory chapter focuses on the aspects of geographic distribution and specialization, rural areas, urban poverty areas, race, and the elderly in relation to health care delivery. The supply of health care professions is summarized including past, present, and future trends. Health manpower distribution and needs assessment data are considered. Intervention approaches in response to the maldistribution of the health professionals, including financial incentives, facility construction, and career placement assistance, are summarized. A final chapter covers the role of area health education centers in improving the distribution of health care providers and in improving the quality of health services. (PHR)

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A REPORT TO

THE PRESIDENT OF THE UNIVERSITY OF MISSOURI

FROM

THE COMMITTEE ON EXPANDED HEALTH PROFESSIONS EDUCATION

JUNE 1979

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1.0 Preface

On July 25, 1978, President James C. Olson appointed a Committee on Expanded Health Professions Education and charged them to "explore the desirability of a state-wide (area health education center) program from both a University and a community perspective." The committee was composed of the deans and directors of all the health professions education schools of the University and other representatives of the faculty and administration. This report is a summary of the committee's findings and a set of recommendations for the future.

During the course of this study, the committee compiled and analyzed voluminous material on the present supply and distribution of health manpower in Missouri, on the need for additional health services among certain groups (especially persons who live in rural areas, members of minority groups, the poor, and the elderly), and on programs and activities designed to address these unmet needs. Special attention was directed at current University efforts to respond to these problems.

The committee organized itself into five task forces, each assigned responsibliity for a major area. The task forces compiled and evaluated a substantial volume of material and supporting documentation before preparing a condensed statement for this report. Persons interested in reviewing any of these data are invited to contact the chairman or the staff director, Dr. Kenneth R. Mares.

The members of the committee appreciate this opportunity to comment upon the health manpower needs of the State of Missouri and to make recommendations about future efforts to assure all Missourians timely access to high quality health services. It is our view that the University, in cooperation with State and local governments, health professionals, and others, will continue to play a major role in these acitvities. We hope that this report will stimulate and encourage additional discussion and planning.

2.0 Conclusions and Recommendations

It is clear from our investigation that the State of Missouri shares a number of health manpower problems with other states. Most importantly, health professionals are not well distributed to meet the needs of our citizens. More attention needs to be given to training for primary care services, to more effective and efficient use of health care providers, to a more equitable geographic distribution of health manpower, and to continued efforts to ensure that all health services in Missouri meet the highest standards of quality.

This report provides a summary of the magnitude of the problem and addresses the various factors which, in the opinion of the authors, contribute to the problem. The University of Missouri is working to address health manpower problems and the authors believe that the University can play a leadership role in further efforts to make high quality health services available to all Missourians. The University cannot, however, independently resolve all of the social, economic, and professional factors that have produced the current situation; only a concerted and coordinated effort involving state and local governments, professional associations, community groups, health care providers, and others will be effective.

This report presents the authors' statement of the problem and a list of recommendations which the committee believes should be undertaken to address the problems of health manpower.

Recommendation #1

The committee recommends that there should be initiated and maintained an educational program which provides factual information on the availability of health care services. This program should address rural areas and the underserved areas of our urban cities. Of particular importance in these target areas are the poor and the elderly, who are often isolated from information specific to their health care needs.

The evidence suggests that available health care services are not fully utilized. In many instances, this situation exists because of a lack of information. The people to whom these services should be available are either not aware of their availability, or are constrained by cultural/racial/economic factors from seeking needed services. This role, the committee feels, is a natural one for the University, possible working in conjunction with other state universities in Missouri.

Recommendation #2

The committee recommends a greatly improved and increased effort to identify and recruit minority and rural students into health care professional programs.

The evidence suggests that minority health care providers have as their patients a vast majority of minority group members. An increase in the number of minority health professionals would increase the amount of health care service available to this segment of the population. In addition, the data clearly suggests that professionals from rural communities are much more likely to locate their practice in rural areas. With respects to physicians, minority and rural origin physicians are more likely to select primary care practice.

Recommendation #3

The committee recommends that educators of the University of Missouri pay much more attention to the concept of the integrated team approach to health care. A great deal more emphasis on the concept of teamwork in the provision of health care should be made in the teaching curriculum.

The physician, the pharmacist, the nurse, the dentist, the technician, the therapist and other kinds of health professionals all have a role to play in a suitable health care delivery system. Too often the underserved community seeks to solve its health service needs through fragmented and piece-meal efforts. Too often the

community seeks medical services in the belief that these services alone will meet their needs. But physicians cannot and will not practice in isolation from other professional colleagues.

The University must help underserved communities to understand the interdependent nature of modern health care. Health professional students should be introduced to inter-disciplinary and multi-disciplinary training as part of their educational experiences.

Recommendation #4

The committee recommends the development of a professional support system to meet the needs of health professionals practicing in underserved areas.

This system, designed and managed in close collaboration with other health professional educational institutions and professional associations, should provide all practitioners with ready access to appropriate continuing education, specialty and sub-specialty consultation, technical information services, and other related support needs. This system will allow the practitioner to keep current in an area that has an ever increasing amount of new information and will decrease the rural practitioners' feeling of professional isolation.

Recommendation #5

The committee recommends that the State of Missouri, working in conjunction with the educational institutions of the state, should initiate a plan to provide such additional health manpower as are required to meet the needs of the people.

Although the supply of health professionals is generally adequate to meet current and projected needs, several categories of personnel are deficient. In medicine, for example, many more primary care physicians are needed. State support to family medicine residency programs in Missouri could produce an estimated

sixty additional family physicians yearly. Several categories of nurses, including masters degree-level professionals and primary care nurse practitioners are in critically short supply. Other disciplines are experiencing similar shortages in specific areas.

Recommendation #6

The committee recommends that each health professional school or program in the University address itself to the issue of education for primary care practice and initiate whatever changes the faculty considers appropriate to enhance primary care training.

The evidence from Missouri and the rest of the nation clearly indicates a substantial need for additional primary care providers. Each faculty should be encouraged to examine their curriculum to ensure that all students are exposed to careers in primary care. Regular, systematic contact with community-based, primary care practice settings should be available to all students.

Recommendation #7

The committee recommends that a placement service should be established, in part to help direct students, who have recently completed their health education experience, to areas in the state that need additional health manpower.

This service would also work with community groups or individuals who were interested in attracting additional health care practitioners to underserved areas. In addition, this service could work with local, state, and federal agencies as well as University administrators in developing additional programs for placing recent graduates in areas of need.

Recommendation #8

The committee recommends that the President of the University appoint a working committee to develop a plan for the creation of a regionalized health professions education system for the State of Missouri.

It is clear from our study that the University is presently

engaged in a number of programs and activities designed to address the problems which we have identified. The University should now explore the desirability of organizing these (and other) efforts into a coordinated program. Until a detailed plan is developed, which includes budget estimates, potential community sites and target areas, faculty and student projections, etc., it is not possible to weigh the relative merits of a regionalized system.

The committee is expressly not endorsing the development of a regionalized system at this time. In the absence of a specific plan of action which addresses the critical educational and economic questions involved, we believe that such endorsement would be premature. The faculty of all the health professions schools of the University should be afforded every opportunity to participate in the development of this plan.

3.0 Introduction

Access to high quality health services is determined, to a substantial degree, by the availability of sufficient numbers of well-trained health care providers. To ensure reasonable access to needed services, these providers must be appropriately distributed, both by location of practice and by the kinds of services they provide. Many people believe that this "manpower" dimension is the single most important factor affecting both access to and the quality of health services.

The distribution of health manpower has been a recurring issue in this country for the past half-century. In recent years it has assumed increased importance as a topic of concern. For example, one highly respected observer noted in 1974 that despite significant disagreement on specific details, health policy-makers were in emphatic agreement on the need to address "...what is emerging...as the paramount health manpower problem: a gross maldistribution of health manpower."

As elsewhere, the question of health manpower supply and distribution has become a topic of discussion and action in Missouri. During the 1977 session, the state legislature enacted 48 884, a bill to provide scholarship assistance to medical students in exchange for service in underserved rural areas. Governor Joseph Teasdale reviewed health care problems in rural Missouri in his "Around Missouri" columns of April 26 and May 10, 1978. The Governor identified education as one area of potential remedial intervention.

The purpose of this report is to provide material for discussion of ways in which the University of Missouri might take additional steps to improve the supply and distribution of health care providers in Missouri, and to further contribute to the improvement of the quality of care. Before material on the supply of health professionals in Missouri and on some of the actions that might be taken to address these goals is presented in subsequent chapters, this introduction will discuss the general

problems of maldistribution with special reference to the task of serving rural areas, urban poverty areas, and the elderly, and will review some of the current efforts of the University of Missouri to address these problems.

It should be noted that much of the material in the introduction and body of this report focuses upon the supply and distribution of physicians, because much more attention in research and in government policy has been given to medical doctors than is true for other health care providers. However, much of what has been learned about physicians applies to other health care professionals. In addition, some economists have found that the distribution of all health care services tends to be correlated with the distribution of physicians.(1)

3.1 Geographic Distribution and Specialization

Problems involving the distribution of physicians have two major dimensions: geography and specialty. The geographic dimension is concerned with whether populations in different areas have adequate access to medical services. The specialization dimension is concerned with whether differing populations have adequate access to appropriate generalist and specialist services. These two dimensions are inextricably intermingled in the real world, and efforts to influence either of them in isolation from the other will inevitably be unsatisfactory.

It is possible, for example, to try to redirect the supply of physicians to underserved rural areas, but sparsely populated communities may be unable to support specialized services efficiently and plans to redirect specialists there may prove impractical. At the same time, working to expand the supply of specialists may have little, if any, effect on the supply of primary care practitioners willing to practice in

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(1) Hambleton, J.W., "Determinants of Geographic Differences in the Supply of Physician Services." Unpublished Ph.D. Dissertation, Department of Economics, University of Wisconsin, Madison, 1971.

underserved population groups. Ultimately, decisions about how many primary care physicians and specialists to prepare and how to organize and distribute their services should be made as part of a systematic plan for improving health care throughout society. We are unable to propose a comprehensive plan of this sort at this time. For reasons given below, however, we are able to conclude that more primary care physicians and other health professionals are needed to serve populations which have too little access to adequate health care.

First, there is considerable consensus among health care experts that more primary care physicians should be prepared in the United States. A recent study on this issue by the General Accounting Office stated as its foremost conclusions that "There appears to be general agreement on the need to train more primary care physicians ... A number of medical organizations, the Congress, and the Administration generally agree that more primary care physicians are needed."(2) The study also found that there is little agreement on the number needed, the extent to which specialists and subspecialists can be relied on to provide primary care, or whether more specialists are needed in various specialties. Furthermore, the National Academy of Sciences recently pointed out that no one really knows how many physicians are in primary care and how many are specialists, because definitions are nebulous and because it is uncertain how many physicians practice in the manner specified in their residencies.(3) Nevertheless, agreement does exist on the need to train more physicians in primary care.

Second, it is clear that primary care physicians are the first point of contact in meeting many of peoples' health needs in modern society. It is not realistic to expect patients to diagnose their own ailments, select appropriate specialists,

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(2) Comptroller General of the United States, Are Enough Physicians of the Right Type Being Trained in the United States? Washington, D.C.: GAO, 1978.

(3) National Academy of Sciences, A Manpower Policy for Primary Health Care. Washington, D.C.: National Academy of Sciences, 1978.

and follow-up on their health problems without the assistance of primary care health providers. This is particularly true in underserved communities such as rural areas and inner-city poverty neighborhoods which lack a sufficient economic base to support a full array of nearby specialists.

3.2 Rural Areas

Mountain and his colleagues began calling attention to inequalities in physician distribution between urban and rural places in a series of papers published in the 1930s. All of their essential findings have been consistently supported and elaborated upon by subsequent research; more precise and sophisticated studies have had the net effect of validating rural disadvantage with increased scientific rigor. For example, a study of Coleman used aggregate (county-level) data to demonstrate the relative disadvantage of rural areas on selected health status indicators. He concluded that "comparisons of urban and rural measures of ... physician availability indicate a relative disadvantage for rural areas."

At the same time that data indicate there is a shortage of physicians in rural compared to non-rural areas; available data also suggest that the need for medical services is greater in rural than non-rural areas. For example, there is a higher proportion of people with disabling chronic disease living in rural areas than anywhere else in the nation.(4) There is a greater number of bed disability days suffered per person per year in nonmetropolitan areas.(5) In some rural counties the infant mortality rate is double that of the national average.(6)

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(4) National Center for Health Statistics, U.S. Department of Health, Education, and Welfare, Health Characteristics of Geographic Regions, Large Metropolitan Areas, and Other Places of Residence--U.S., July 1963-June 1965, Series 10, No 36, U.S. Government Printing Office, Washington, D.C., 1967.

(5) Ibid.

(6) Planned Parenthood-World Population, Center for Family Planning Development Program. Need for Subsidized Family Planning Services: United States, Each State and County, 1968. Washington, D.C. U.S. Printing Office, 1969, Table 1.

The number of short-stay hospital discharges, indicating the need for hospitalization, is higher in nonmetropolitan areas. The accident fatality rate in farming is higher than in any other occupation except mining and construction.[7] The lack of emergency care services in rural areas has resulted in greater loss of "salvageable" cases from rural automobile accidents.[8]

The evidence just cited suggests that rural residents have health problems as severe or more severe than their urban counterparts. Yet their utilization of medical services is lower. Although the cause of this discrepancy lies at least partially in economic factors, availability of health services may be central to the problem. The number of active physicians in direct patient care per 100,000 population varies from 192 in the largest metropolitan counties to 42 in the most rural counties. These figures represent all specialties, i.e., general practice, primary care, and other specialties. If general practitioners are removed from the count, the discrepancy is even more pronounced.

Moreover, the rural/urban disparity in physician supply apparently is increasing. Rural doctors are older than urban doctors, and consequently are retiring and dying at a faster rate, and they are not being replaced. A little over 6 percent of all U.S. medical school graduates in the combined classes of 1963, 1964, and 1965 have now located in non metropolitan counties of less then 50,000; however, such counties represent 19 percent of the national population. It is evident that the unequal distribution of physicians is not correcting itself.

Assessments of the rural health manpower problem and possible solutions differ considerably. Whether caused by a

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(7) Doherty, N., Rurality, Poverty and Health - Medical Problems in Rural Areas, Department of Agriculture, Economic Research Service, Agricultural Economic Report 172, Washington, D.C.: U.S. Government Printing Office, 1970, pp. 4, 6.

(8) Waller, J.A., R. Curran, and F. Noyes, "Traffic Deaths: A Preliminary Study of Urban and Rural Fatalities in California." California Medicine, 101: 272-276, October 1964.

national shortage of physicians, or by maldistribution, or both, younger physicians are failing to replace established practitioners who leave rural practice due to death, retirement, or overwork. From 1963 to 1969 there was a 30 percent increase in the number of counties in the United States without a physician. Reasons for the decline in the number of rural practitioners generally are varied and quite complex. Yet many of the reasons can be found in the nature of rural practice and the personal and educational factors originally disposing physicians to practice in urban or rural areas.

Later in this report we present data showing that many rural areas in Missouri are underserved with respect to medical and other health care services, and we discuss actions which might be taken to increase the number of physicians and other health care providers in these communities. Most of the data and discussion refer to underserved rural areas, because most of the literature on health manpower malidstribution and most of the efforts which have been made in Missouri and elsewhere to improve the distribution of health care providers have dealt specifically with rural communities. We are equally concerned with the problem of improving access to health services for communities which are underserved largely because their residents are low in income rather than sparsely populated. (In many cases, of course, rural areas are disadvantaged in health services due both to low income and geography.) The problem of improving health services for low income persons frequently is severe whether they live in low income or mixed income communities, but as we indicate in the following sections, this problem tends to be most acute and action is particularly needed to improve the supply of health care services in urban areas with a heavy concentration of poor and socially disadvantaged residents.

3.3 Urban Poverty Areas

Knowledge of the health problems of urban poverty areas can be obtained from two major sources: 1) studies on health conditions of the poor in general; and 2) studies on health

conditions of residents of low income urban communities in particular. Both types of studies can increase understanding of the needs of residents of urban poverty areas. Both will be drawn on in this section in summarizing the current situation with respect to maldistribution of health care services for the urban poor.

We must emphasize at the outset that the problems of providing adequate health service for urban poverty populations are even more complex than is true in the case of underserved rural areas. In some cases, maldistribution in rural areas can be corrected merely by changes in practices involving the recruitment, education, and placement of health care professionals, provided that an underserved rural area has a sufficient population and economic base to support additional personnel. In urban poverty areas, by way of contrast, interrelated factors involving the cultural and social background of residents and the economic base for health services invariably are interacting to affect the supply of health care personnel and the ways they are utilized by clients. For this reason, health problems involving urban poverty areas are unlikely to be significantly alleviated in the absence of coordinated policies and plans involving every level of government and all major institutions which are concerned with or affect people's behavior with respect to the health system. Higher education efforts to improve the supply of health personnel available to the urban poor clearly constitute only one element in a much larger effort to improve health conditions in urban poverty areas.

As a result of major national programs in the 1960s and 1970s to improve health services for the poor in general and the urban poor in particular, some gains have been made in reducing health care problems of low income persons in the United States. Data indicating improvements recently were summarized by Wilson and White, who compared information from the national health interview surveys of 1964 and 1973, and concluded that "some of the gaps between the health care of the poor and nonpoor have

been narrowed or closed, particularly those that once existed in hospital and outpatient physician utilization areas in which the federal government has initiated large-scale programs to increase access to medical care." (9)

Wilson and White, as well as others, have found that large gaps still remain and in some cases have not been narrowed significantly. Thus they pointed out that there is "no evidence of marked changes in the utilization of dental care by the poor and the nonpoor," and that the poor still suffer a disproportionate "impact of illness as measured by restricted activity days and limitation of activity due to chronic conditions." (10) Similarly, Davis recently reviewed health care developments of the 1960s and 1970s and concluded that

> While Medicaid appears to have been instrumental in improving access of the poor to medical care, the poor still do not participate in 'mainstream' medicine of comparable quality, convenience, and style to that received by more fortunate persons. Poor persons continue to receive care in crowded, dreary clinics with long waits and few amenities. Care is frequently discontinuous, episodic, fragmented, and impersonal, with patients seeing a different physician upon each visit and for each type of ailment ... [and] Rapid inflation in medical care costs in recent years may be undoing much of the progress made by the poor in achieving better health care in the last decade. (11)

Elsewhere, Davis also has analyzed date on relationships between medical payments and utilization of medical services by the poor. This analysis indicated that progress which has been

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(9) Wilson, R.W. and E.L. White, "Changes in Morbidity, Disability, and Utilization Differentials Between the Poor and the Nonpoor," Medical Care 15, 636-646, August 1977.

(10) Ibid.

(11) Davis, K. " A Decade of Policy Developments in Providing Health Care for Low-Income Families," pp. 197-231 in A Decade of Federal Anti-Poverty Programs edited by R.H. Haveman. New York: Academic Press, 1977.

made has not been shared by all of the poor. She concluded that "those who fall between the gaps" in financial support programs and "are unserved by either private insurance or public programs lag well behind other poor persons in use of physician services."[12]

Other research has helped to pinpoint some of the deficiencies in health care services for the poor and the obstacles which stand in the way of improving these services. Many of these obstacles are associated with the conditions of poverty itself, particularly the fact that low income persons tend to have relatively little education and relatively little knowledge of how to use the health care system effectively. For example, Becker and Maiman examined data on determinants of compliance with health care recommendations and found that "adherence to instructions is especially poor in low-income clinic populations, where noncompliance frequently is reported to be in excess of 60 percent."[13] In related types of analysis, Weiss and Greenlick have reported that low income persons are much more likely than middle class persons to delay making contact with the health care system even when both groups have the same access to care,[14] and Kirscht, Becker, and Eveland have found among welfare mothers that "personal situation" of the mother (including educational level and health status) is strongly associated with the amount of health care mothers obtain for their children.[15] Similarly, Lefcowitz has surveyed the literature on the relationships between income and health, and concluded that when education is

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(12) Davis, K., "Medicaid Payments and Utilization of Medical Services by the Poor," Inquiry, 13, 122-135, 1976.

(13) Becker, M.H. and L.A. Maiman, "Sociobehavioral Determinants of Compliance with Health and Medical Care Recommendatoins," Medical Care, 13, 10-24, January 1975.

(14) Weiss, J.E. and M.R. Greenlick, "Determinants of Medical Care Utilization: The Effect of Social Class and Distance on Contacts with the Medical Care System," Medical Care, 8, 456-462, 1970.

(15) Kirscht, J.P., M.H. Becker, and J.P. Eveland, "Psychological and Social Factors as Predictors of Medical Behavior," Medical Care, 14, 422-432, May 1976.

taken into account in analyzing this relationship, the "correlation is considerably diminished, usually to the point of disappearance."(16)

In addition to personal characteristics associated with low or inadequate utilization of health care services, research also had identified some of the structural barriers impeding efforts to improve health care for the poor. For example, Dutton tested three alternate explanations of the relationship between low income and low use of health services: the inadequate financial coverage explanation, which attributes low use to a constellation of social and psychological traits handed down from generation to generation; and the systems barrier explanation, which attributes low use to inadequacies in the health care systems typically available to the poor. Using data collected in Washington, D.C. in the early 1970s, she found that the financial coverage and culture of poverty explanations only partially explain income differentials in initiating symptomatic care. "These differentials are also attributable," she concluded, "to inadequacies in the health care systems often used by the poor, notably hospital outpatient departments and emergency rooms." (17)

Moreover, research also indicates that efforts to improve the structure of health services for the poor sometimes are clearly successful. Though such projects frequently attempt at the same time to reduce financial and cultural barriers to health care for the poor, it appears that reductions in structural barriers play an important part in accounting for the success of such projects. Among reports pointing to the potential efficacy of efforts to improve the structure of health services for the poor are the following:

1. After reviewing research on the federal Maternal and

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(16) Lefcowitz, M.J., "Poverty and Health: A Re-examination, "Inquiry," 10, 3-31, 1973.

(17) Dutton, D., "Explaining the Low Use of Health Services by the Poor: Costs, Attitudes, or Delivery Systems," American Sociological Review, 43, 348-368, June 1978.

Child Health program, Davis concluded that the program has had some success in improving the health of mothers and children, including in some cases mothers and children in urban poverty areas.[18]

2. Riessman examined data on several experimental projects to improve health services for the urban poor, and concluded that they "all suggest that the health behavior of the poor can be radically altered, and within a relatively short period of time, by introducing structural changes in the way services are offered."[19] Regarding the New York Hospital-Cornell project, for example, the data showed that offering of an appointment markedly improved utilization, and a combination of structural improvements, including emergency and inpatient care and bilingual staffing, led to a substantial increase in the use of preventive services.

3. Several studies of neighborhood health centers in urban poverty areas have indicated that such centers can result in improved health conditions in these neighborhoods. Mills, for example, has described the establishment of a neighborhood health and day care center in an urban ghetto neighborhood and reported that it led to a large increase in the proportion of children immunized and in post-partum visits by neighborhood mothers. She concluded that although a "small neighborhood center cannot change living conditions in a ghetto ... [it] is, however, a better tool than individuals or families acting alone to provide self-care."[20] Davis has examined the research on federally-supported Neighborhood Health Centers and summarized this research in the statement that "Comprehensive health centers

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(18) Davis, K., "A Decade of Policy Developments," Op. cit.

(19) Riessman, C.K., "The Use of Health Services by the Poor," Social Policy, 41-49, May-June, 1974.

(20) Mills, N., "Self-Care in Urban Settings," Health Education Monographs, 5, 137-144, Summer, 1977.

have demonstrated an ability to provide high quality care with a major impact on health of the poor."[21]

Urban poverty areas in Missouri exemplify the same kinds of structural deficiencies in health care for the poor, including lack of adequate numbers of health care professionals within easy access to the residents of these ares, as do poverty neighborhoods elsewhere in the U.S. St. Louis, for example, has one of the highest poverty rates in the United States, with 26 percent of the population reporting an annual income below $5,000 in 1975. A large proportion of the poverty population in St. Louis lives in predominantly black, low income neighborhoods on the north side of the city. For the city as a whole, there are only twelve primary care physicians in private practice, and more than half of the physicians practicing primary care or internal medicine are over 60 years of age. Data such as these have led R.D. Wochner, Director of the City Department of Health and Hospitals, to conclude that a real problem in the inner city in coming years will be the shortage of private practitioners.[22]

Kansas City also has large poverty areas which are medically underserved. The inner core poverty area, for example, has severe health problems--the infant death rate is 38 per 1,000 births compared with 26 for the city as a whole, and mortality due to tuberculosis is more than triple the city rate--but efforts which have been made to improve health services have not been entirely successful. Problems in the health care system in poverty areas in Kansas City recently have been summarized as

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(21) Davis, K., "A Decade of Policy Developments," op. cit. However, a recent GAO investigation of Neighborhood Health Centers concluded that major improvements need to be made in their operation. These improvements include reductions in staff in centers which are overstaffed for the number of patients being treated and steps to make sure that they are serving residents of medically underserved areas. See Comptroller General of the United States, Are Neighborhood Health Centers Providing Services Efficiently and To the Most Needy? Washington, D.C.: GAO, 1978.

(22) "Health Care in St. Louis," Urban Health, 16-40, March 1977.

follows:

> Problems inherent in the system have evolved out of inadequately defined linkages between the centers and various health resources and over differences concerning the need for and priority of given health programs and services. This situation is further complicated by insufficient public education to inform the eligible population of available resources and to motivate them to use the system effectively. More specifically, these problems encompass: 1) access to comprehensive care; 2) patient fragmentation; 3) income and financing; 4) lack of outreach and preventive programs; 5) geographic maldistribution.(23)

Shortages of primary care physicians in inner city poverty areas are particularly pernicious because they help to create overloads that hamper the functioning of other parts of the health care system. Mann has described one aspect of this process as follows:

> The basic need in inner-city communities is for primary care. Because there are so few private physicians with practices located in the inner city, the burden of providing primary care falls on hospitals and clinics. However, hospitals and clinics are hindered in their attempts to provide care by inadequate financing and lack of manpower. Consequently, while low-income and indigent patients continually turn to hospital emergency departments to fulfill the role of family physicians, hospitals continually grapple with the financial problems caused by treating overwhelming volumes of 'cost bases' (Medicare-Medicaid) or nonpaying patients. The results are high mortality and undiagnosed, untreated morbidity for the communities and steady deterioration of institutional resources for the hospitals.(24)

It is obvious that the University of Missouri cannot by itself overcome these kinds of serious health problems which exist

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(23) Kansas City, Missouri Health Department, Application to the Robert Wood Johnson Foundation Municipal Health Services Program. September, 1977.

(24) Mann, J.B. Jr., "Black Community's Crisis of Care Hits Hospitals and Consumers," Hospitals, 51, 70-73, March 16, 1977.

in urban poverty areas in St. Louis, Kansas City, or other parts of the state. However, working with other governmental and private agencies, it should be able to help alleviate such problems as lack of access to comprehensive care, patient fragmentation, lack of outreach and preventive health measures, and geographic maldistribution of health care providers in the inner city and other medically underserved communities in Missouri.

3.4 Race and Access to Health Care

We have noted that a large proportion of the population of some urban poverty areas consists of black and other racial-ethnic minority groups. Minority groups also constitute a significant proportion of the population in medically underserved areas in some other parts of Missouri. This pattern raises the question of whether predominantly minority communities are additionally underserved over and beyond correlations which relate race, income, and the availability of health services, and whether there are policy implications from such a differential.

We do not know of studies in Missouri which have explicitly posed these questions, but some national data are available on health service for the black minority, and these data suggest that race as well as income should be taken into account in identifying underserved segments of the population and planning to improve their health services.

Elesh and Schollaert, for example, conducted a systematic study of factors affecting the distribution of physicians in Chicago and found that there was a substantial effect of race on physician's location, independent of other determinants such as size, age, and income of the neighborhood population, percent of population with twelve years or more education, and number of beds in nearby hospitals. "Physicians do avoid practice in black areas," they concluded, but they also found that the "avoiders" are chiefly general practitioners rather than specialists and that the tendency to avoid black areas is weak or non-existent

in black communities with high aggregate income.[25] Thus there appears to be an interaction effect wherein maldistribution is greatest in areas which are both low income and black. Similarly, Gray also has cited evidence indicating that physicians avoid locating in areas that are predominantly low income and black.[26]

Available data also suggest that preparing more black physicians could help alleviate shortages which exist in low income, black neighborhoods. One should not overstate the case for this conclusion, because many black physicians tend to avoid serving low income urban populations just as do many white physicians. It also should be kept in mind that nearly 90 percent of black patient visits to a physician are to white physicians.[27] On the other hand, decades of cultural and social practices associated with segregated living ptterns have resulted in a situation wherein black physicians are much more likely than white physicians to live in or near black communities and serve black patients, as indicated by the facts that approximately 87 percent of the visits to black physicians are from black patients.[28] It should be noted that in a recent study to identify characteristics of black physicians in the United States 30 percent of the respondents indicated they were in general practice (including family practice) as compared with 18 percent of all active physicians (MD's only).[30]

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(25) Elesh, D. and P.T. Schollaert, "Race and Urban Medicine Factors Affecting Distribution of Physicians in Chicago," Journal of Health and Social Behavior, 13, 236-250. September, 1972.

(26) Gray, L.C., "The Geographic and Functional Distribution of Black Physicians: Some Research and Policy Considerations," American Journal of Public Health, 67, 519-526, June 1977.

(27) Rocheleau, B., "Black Physicians and Ambulatory Care," Public Health Reports, 93, 278-282, May-June, 1978.

(28) Ibid.

(29) Gray, "The Geographical and Functional Distribution," op. cit.

(30) "Characteristics of Black Physicians in the United States: Finding From A Survey" U.S. Bureau of Health Resources Development, Report No. 75-147 February 1975.

For these reasons it is all but certain that an increase in the supply of black physicians would help alleviate shortages of physicians which are found in urban areas.

Some progress has been made in recruiting more black students into medicine. Nationally, black students accounted for 6.7 percent of first-year medical school enrollment in 1978, but this figure was a decline from the peak of 7.5 percent registered in 1974. We recognize that increasing the percentage of black and other minority students in Missouri medical schools and other health-training institutions will not by itself automatically result in large future increases in the supply of health care professionals available to underserved poverty areas. Nevertheless, action along these lines carried out as part of a larger coordinated plan for improving health services in inner city and other underserved areas in Missouri could have a significant impact.(31)

3.5 The Elderly

Another large segment of the population which is underserved with respect to health care consists of many of the elderly.

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(31) Joseph B. Mann, Jr. has summarized some of these possibilities as follows in a discussion of the "crisis of care" facing hospitals and consumers in predominantly black communities:

New Manpower resources must be developed and retained in the inner cities. Increasing numbers of persons from minority groups must be recruited for medical education. Health professionals tend to remain in the same geographic area in which they are trained. Thus, it may be possible to encourage those who are trained in an inner-city setting to remain in this setting, if they are provided with support such as low-cost loans or grants to physicians for establishing their private practices or locating their offices in or near hospitals. Training programs in the allied health professions that recruit students from low-income communities should be very successful in retaining the graduates in these communities ... Clinical affiliations between hospitals and health education programs also should be pursued much more aggressively. "Black Community's Crisis of Care Hits Hospitals and Consumers," Hospitals, 51, 70-73, March 16, 1977.

Health care needs of the elderly are widely recognized, and for this reason we will not deal with these needs in detail in this introduction except to take note of recent research summarizing the current situation involving this large and growing segment of the population.

Davis has surveyed the research on Medicare, Medicaid, and other programs designed to improve health services for the elderly, and concluded that Medicare in particular had resulted "in a major redistribution of hospital care to the aged."(32) However, she also stresses that Medicare benefits have been unequally distributed among income classes, with the greatest benefits going to the very lowest and the very highest income groups. For low income elderly persons not covered by Medicaid, the required patient payments appear to have significantly impeded access to health care. There is no reason to believe that the situation in Missouri is very different from that in the United States as a whole.

Other types of data also support the conclusion that many elderly persons in the United States still are severely underserved with respect to quality health services, and that this is particularly true for those who live in near poverty or in communities with a shortage of health care personnel. For example, Kravits conducted an ingenious study which examined the relationship between health attitudes and discretionary use of physician and dentist services. The underlying rationale for the study was that subgroups in the population which have a significant negative correlation between attitudes and utilization are likely to face greater than average barriers to preventive health care, because the elimination of barriers would tend to reduce the tendency for utilization to depend on predispositions to seek out preventive care. Based on this rationale, she hypothesized that low income respondents and black respondents would have higher correlations between attitudes and discretionary

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(32) Davis, "A Decade of Policy Developments," op. cit.

health care behavior than would the population as a whole. These hypotheses were confirmed, and in addition she found that

> it is black individuals above [orig. ital.] the near poverty level who seem to show the highest correlation ... Furthermore, age was shown to be an important variable which must be considered along with the highest correlations between attitudes and behavior, namely blacks above the poverty line and individuals over 65.(33)

3.6 Conclusion

Data presented have indicated that residents of rural areas and urban poverty areas as well as racial minority groups and the elderly tend to be underserved in the health care system. It also should be noted that rural areas tend to have high proportions of minority residents, and both rural areas and urban poverty areas have disproportionately high percentages of elderly residents. Thus there is considerable overlap in the types of underserved populations we have identified in this introduction. Low income elderly persons living in rural areas or in urban poverty areas probably are the most underserved of all the population groups in Missouri, as in other parts of the United States,(34) but the problem is much broader than that and has begun to impact the "near poor" as well as middle class families which are beleagured by inflation and have not gained much from government efforts to improve the quality of health care. Concerted efforts are needed to overcome the maldistribution of health care providers and other manifestations of inequities that exist in the health care system serving these and other underserved segments of the population.

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(33) Kravits, J., "The Relationship of Attitudes to Discretionary Physician and Dentist Use by Race and Income," pp. 73-93 in R. Anderson, J. Kravits, and O.W. Anderson (eds.), Equity in Health Services. Cambridge, Mass.: Ballinger, 1975.

(34) Current estimates indicate that there are 45 to 50 million people in rural areas or low income neighborhoods without an adequate supply of physicians. See U.S. Congress, House, Committee on Ways and Means, Subcommittee on Health, Hearings on Medicare Reimbursement for Physician Extenders Practicing in Rural Health Clinics. Washington, D.C.: U.S. Government Printing Office, 1977.

One mechanism through which educational institutions can participate in addressing these problems is area health education centers (AHECs). While these programs are too new to be able to report definitive results, they appear to offer considerable potential for long term improvements in health m manpower distribution. Recently the General Accounting Office, in a report to Congress, favorably reviewed the initial accomplishments of the national AHEC program, including a project at the University of Missouri-Kansas City.(35)

The greatest potential appears to be realized when AHEC projects are designed as components of larger systematic efforts at improving health manpower distribution.

In the following sections we consider steps that might be taken to achieve this goal, with particular reference to the State of Missouri and to possibilities which the University of Missouri might pursue in cooperation with other institutions. Section 4.0 is concerned primarily with the supply of health care professionals. Section 5.0 deals with problems of maldistribution. Section 6.0 considers alternative intervention techniques, and Section 7.0 focuses on the role of health professions education and area health education centers. Material from these various sections and recommendations for the future are summarized in Section 2.0. We hope this document will prove useful in initiating further discussion leading to specific efforts to improve the distribution of health care providers and otherwise help improve the funtioning of the health care system in Missouri.

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(35) Report to the Congress of the United States "Progress and Problems in Improving the Availability of Primary Care Providers in Underserved Areas" United States General Accounting Office, HRD-77-135 August 22, 1978, p.70.

4.0 The Supply of Health Professionals: A Summary

The increase in the number and capacity of the nation's health profession schools from the mid-1960s has resulted in major increases in the supply of health manpower, with further expansion assured in the years to come. In fact, the number of practitioners in the major health professions is projected to increase from 40 to 70 percent between 1975 and 1990, an increase far in excess of the anticipated population growth during the same period. Consequently, the practitioner-to-population ratio should rise well above current levels.

The ratio of physicians per 100,000 population is projected to rise from about 177 per 100,000 in 1975 to 241 per 100,000 in 1990, a 37 percent increase.(1) The corresponding growth for the dentist-population ratio is expected to be 24 percent, for optometrists 20 percent, and for pharmacists 23 percent...(2) While future requirements for health professionals cannot be predicted with any degree of certainty, there is little doubt that by 1990 the substantial increase in supply of health manpower "should bring requirements and supply of most health professions into closer balance than any time in the nation's history. No severe shortages are foreseen in any health manpower category in 1990. In a few categories the projected supply may somewhat exceed projected requirements."(3)

There is every indication that the national situation is paralleled in most of the states. Missouri's health professions schools (Medicine, Pharmacy, Dentistry, Nursing) appear to be fully capable of producing the number of graduates necessary to satisfy state needs, although there may be growing pressure for advanced graduate training (including the doctoral degree) in the

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(1) DHEW. A Report to the President..., August 1978, (HRA) 78-93, p. I-1.

(2) Ibid. (3) Ibid., p. I-2.

nursing profession. Data show, moreover, that Missouri benefits from the influx of health professionals trained in nearby states who compensate for Missouri-trained graduates and residents leaving the state upon completion of their education.

A shortage in the aggregate supply of health professionals, therefore, is not the problem. In addition to questions pertaining to quality of care, availability of primary care, improvement of health care status, the educational system, representation of women and minorities in the health professions, and health care cost, an area of major concern has been the geographic distribution of health practitioners; or, more specifically, the prevailing maldistribution of practitioner supply in rural and inner city areas.

A considerable amount of material has been gathered which offers data relative to the existing and projected supply of health manpower per se, with the basic findings being those referred to above. Each section consists of three parts dealing with (a) the national scene, (b) the conditions in the state, and (c) education and training. It should be noted that "(a)" and the first (national) part of "(c)" consist of primarily of excerpted passages from DHEW's A Report to the President and Congress on the Status of Health Professions Personnel in the United States, August 1978. Section "(b)" is similarly primarily comprised of quoted excerpts from Missouri Health Manpower Analyses: Summaries, Conclusions, Recommendations by Lyn Fox, Lanis Hicks, Gayle Lane, Office of Comprehensive Health Planning, June 1976.

4.1 Supply of Physicians in the United States

In 1975 there were an estimated 378,600 active physicians (MD's and DO's) in the United States, as compared with 288,600 in 1965, an increase of 90,000 or 31 percent. Over the same decade, the supply of physicians has also increased markedly in relation to the population, rising from 148 per 100,000 to 177

per 100,000.

Projections made by the Bureau of Health Manpower (which include analysis of the effect of the Health Professions Educational Assistance Act of 1976, PL 94-484, hereafter referred to as HPEA or PL 94-484) show that the supply of physicians will continue to increase sharply over the next 15 years, both in absolute numbers and in relation to the population. The ratio of active physicians (M.D. and D.O.) to population is expected to grow from 177 active physicians per 100,000 total U.S. population in 1975, to about 242 per 100,000 in 1990. Despite this large increase, distribution problems are expected to remain, however, as reflected by the emphasis placed by PL 94-484 on programs to address the issues of specialty and geographic distribution.

4.1.1 Age, Sex, and Minority Composition of Physician Supply

Slightly more than one-half of all physicians are under age 45, and there is a similarity between the age distribution of M.D.'s and D.O.'s. Over the past 7 years the average age of physicians has decreased slightly due to the accelerated rate of increase in the number of recent medical school graduates.

A significant aspect of the physician personnel situation involves the representation of minorities and women. As of 1975, minorities are estimated to comprise only about 3 percent of all active physicians and women 8 percent. Although there has been a substantial and continuing increase in medical school enrollment of women in the recent past, the same cannot be said for minority enrollment. The number of minority enrollments has increased substantially, but the increases have leveled off in the past two years, both in absolute numbers and as a percent of all enrollments. A small decrease from previous levels was observed in 1976.

The proportion of women in allopathic medicine has increased slowly but steadily since 1970, from 6 percent of all M.D.'s to nearly 10 percent in 1975. Women represent a much

smaller percent of the osteopathic physician supply (about 6 percent) at the present time. Blacks, who comprise about 13 percent of the national population, comprise only about 3 percent of the physician supply.

4.1.2 The Projected Supply of Physicians in the United States

The primary care "marker" specialties are expected to claim an ever increasing share of the supply of active M.D.'s, climbing from 38.4 percent in 1974 to 44.5 percent in 1990. In this trend projection, increases in the proportion of primary care manpower, vis-a-vis total physician manpower, in large part reflect the recent changes in specialty preference of physicians entering graduate training--a change from non-primary care specialties to primary care specialties. This also related in part to the widely publicized shortages in primary care and to Federal support of family practice. These projections also indicate that "other medical specialties" are expected to increase from 5.3 percent of the total in 1974 to 6.0 percent in 1990, and that the surgical specialties and "other" specialties will show declines in their proportion of the total.

By applying the first year residency trend line to high and low assumptions of U.S. graduates and foreign medical graduate additions, a range of estimates was developed which is intended to reflect additional parameters of possibilities. According to this analysis the number of active M.D.'s practicing in the primary care marker specialties may range from 242,000 to 260,300 by 1990.

Generally speaking, all of the above projections show increases in absolute numbers of physicians in the primary care categories, both M.D. and D.O., and substantial increases in their ratios to population. Again, however, it should be kept in mind that these figures represent primary care physician "head counts," not primary care services.

The projected increase in aggregate physicians is of such magnitude, compared to expected increases in the U.S. popu-

lation, that even if the proportion of all physicians in primary care were to decrease, the primary care physician/population ratio would still rise substantially.

4.1.3 Supply of Physicians in Missouri

As of January 1976, there were 7,074 physicians[1] actively engaged in direct patient care activities in the State of Missouri. Of these, 3,787 are primary care physicians[2] and 3,287 are in the secondary and tertiary specialties. The state ratio of total active physicians per 100,000 population is 152.30. This is above the most recently calculated national ratio which is 136.32. The state ratio of active, primary physicians per 100,000 population is 81.53. The ratio of active secondary and tertiary physicians per 100,000 population in Missouri is 70.77. The mean age of the active physicians in Missouri is 42.4 years.

Translating these 7,074 active, direct patient care physicians into full-time equivalency terms, the number is reduced to 6,202. Of these, 3,546 are primary care physicians, and 2,656 are engaged in secondary and tertiary specialties. The state ratio of total full-time equivalent, direct patient care physicians per 100,000 population is 133.51 Comparable ratios of primary care physicians per 100,000 population and secondary and tertiary physicians per 100,000 population for Missouri are 76.32 and 57.18 respectively.

It is apparent that in comparison to the national average, Missouri does not appear to have a problem associated with the number of physicians on a statewide basis. The nature of the problem is one of distribution. While the state appears to have

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(1) Interns and residents are included.

(2) Primary care physicians have been defined as those in the specialties of general and family practice, internal medicine, obstetrics and gynecology, pediatrics, and general surgery.

an adequate supply of physicians there are areas within Missouri which have a deficiency of physician services. Consequently, methods must be devised to alleviate this distribution problem.

Based on status quo assumptions current indications are that even with projected growth in population, additional numbers of physicians beyond our present state level will not be required in 1980 and 1990; however, replacement needs due to the age of the physician population do exist. Presently 7.2 percent of our total physician population is above the age of 65. In 1980, this will increase to 13.4 percent and 1990, 32.7 percent of the physicians may be over the age of 65.

It should be pointed out that of all the specialists, general and family practitioners do presently comprise the largest percent of physicians over 65 years of age and will continue to do so through 1990. Therefore, it can be concluded that replacement requirements are greatest for general and family practitioners.

4.1.4 Medical and Osteopathic Schools in Missouri

Table 1 shows the location of the six schools of medicine and osteopathy in Missouri. Of these six, four are schools of medicine and two are colleges of osteopathy. Four of the six schools or colleges are privately owned institutions. The privately owned institutions include Kansas City College of Osteopathic Medicine, Kirksville College of Osteopathic Medicine, St. Louis University Medical School, and Washington University School of Medicine. The two publicly owned institutions in the state are the University of Missouri-Columbia School of Medicine and the University of Missouri-Kansas City School of Medicine.

4.1.5 Number of First Year Students at Missouri Schools of Medicine and Osteopathy

Table 2 shows the number of first year students who entered Missouri schools of medicine or osteopathy. During the past nine years there has been a gradual increase of first year students for each of the six schools. In 1969-70 the total first year enroll-

TABLE 1: MISSOURI SCHOOLS OF MEDICINE AND OSTEOPATHY, 1976

LOCATION	SCHOOL
Columbia	University of Missouri-Columbia School of Medicine
Kansas City	Kansas City College of Osteopathic Medicine
Kansas City	University of Missouri-Kansas City School of Medicine
Kirksville	Kirksville College of Osteopathic Medicine
St. Louis	St. Louis University Medical School
St. Louis	Washington University School of Medicine

Sources: American Association of Colleges of Osteopathic Medicine, The Education of Osteopathic Physicians (Washington, D.C.: American Association of Colleges of Osteopathic Medicine, 1975), p. i; and Anne E. Crowley, ed., 74th Annual Report, Medical Education in the United States: 1973-74, educational supplement to the Journal of the American Medical Association, 231, (January 1975), p. 103.

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ment was 441 and in 1977-78 the total first year enrollment was 764. This represents an increase of almost 75% in the nine year period. Although five of the schools' first year enrollments appear to be stable, it should be mentioned that the UMKC School of Medicine plans to eventually have a first year class of 100.

4.1.6 Number of Graduates from Missouri School of Medicine and Osteopathy

Table 3 shows the number of graduates from the six schools of medicine and osteopathy since the academic year 1969-70. For the past nine years there has generally been a steady increase in the number of students that have completed their medical or

TABLE 2: NUMBER OF FIRST YEAR STUDENTS OF MISSOURI SCHOOLS OF MEDICINE AND OSTEOPATHY
1969-70 Through 1977-78*

UNIVERSITY	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
University of Missouri-C	100	100	110	110	110	109	107 5 112	95 8 103	108 4 112
University of Missouri-KC	NA	18	76	88	82	71	60	77	76
Washington University	102	113	113	120	120	124 2 126	129	125	122 5 127
St. Louis University	133	141	146	154	155	155	155	157	151
Kansas City College Of Osteopathy	NA	112	114	121	126	152	164	165	165
Kirksville College Of Osteopathy	106	109	109	119	122	122 6 128	125 3 128	122 3 125	132 1 133
TOTALS	441	593	658	712	715	741	746	752	764

* Beginning in 1974 the Missouri Commission on Higher Education lists both full-time and part-time students

Sources: Patrick Hurley, Selected Health Occupations - Educational Programs in Missouri, 1977, Missouri Department of Social Services, Division of Special Services, State Health Planning and Development Agency, Health Manpower Planning
Enrollment Data - Missouri Commission on Higher Education.

TABLE 3: NUMBER OF GRADUATES OF MISSOURI SCHOOLS OF MEDICINE AND OSTEOPATHY

1969 Through 1977-78

UNIVERSITY	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
University of Missouri-C	76	84	98	99	96	105	100	116	109
University of Missouri-KC	NA	NA	NA	9	4	21	25	33	
Washington University	88	92	95	97	114	128	142	138	
St. Louis University	101	121	115	122	130	147	136	149	
Kansas City College Of Osteopathy	107	111	102	111	108	118	127	139	
Kirksville College Of Osteopathy	101	101	105	105	102	104	119	113	
TOTALS	473	509	515	543	554	623	649	688	

Sources: Patrick HURLEY, Selected Health Occupations - Educational Programs in Missouri, 1977, Missouri Department of Social Services, Division of Special Services, State Health Planning and Development Agency, Health Manpower Planning
Enrollment Data - Missouri Commission on Higher Education.

osteopathic training. In 1969-70 the total number of graduates was 473 and in 1977-78 the total number of graduates was 728. This represents an increase of almost 54% in the nine year period.

4.1.7 Graduates of Medical Schools in the State of Missouri who Select Primary Care* Residency Training by Location of Residency

One of the most important factors that influence the distribution of physicians is the location of their residency training programs.** Table 4 shows that for the period of time from 1975 to 1978 the four medical schools in Missouri graduated a total of 1702 physicians. Of those 1702 physicians 964 (57%) selected residency training programs in primary care specialties.

However, when one compares the number of physicians who graduated in the four year period with those"selecting" primary care residency training in Missouri there are only 341 (20%). If only the two state supported medical schools are considered for this time period, there are 593 that graduated with 337 selecting primary care training. However, only 128 or 22% of the graduate pool of physicians from the two state supported medical schools selected primary care training programs in Missouri. This fact is particularly significant because nearly all of the graduates from the two state supported medical schools are residents of the state.

4.1.8 Missouri Physicians (M.D.'s and D.O.'s) by Missouri Schools of Graduation - 1978

Table 5 shows the number of Missouri physicians (M.D.'s and D.O.'s) by Missouri schools of graduation. In 1978, 2,973 physicians had been graduated from Missouri schools and were practicing in the state. The number represents 40% of all the physicians licensed in 1978 for the state of Missouri.

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* Includes family practice, internal medicine and pediatrics.

**The influence on residency training as it effects the physician's first practice location is discussed in detail in section six.

TABLE 4: GRADUATES OF MEDICAL SCHOOLS IN THE STATE OF MISSOURI
WHO SELECT PRIMARY CARE* RESIDENCY TRAINING, BY PLACE OF RESIDENCY

Institution	1975 Total Grad.	1975 Primary Care Res.	1975 %	1975 P.C. Res. In Mo.	1975 %	1976 Total Grad.	1976 Primary Care Res.	1976 %	1976 P.C. Res. In Mo.	1976 %	1977 Total Grad.	1977 Primary Care Res.	1977 %	1977 P.C. Res. In Mo.	1977 %
St. Louis University	145	82	(57)	29	(20)	137	80	(58)	45	(33)	147	77	(52)	22	(15)
UMKC											92**	58	(63)	32	(35)
UMC	106	57	(54)	21	(20)	100	58	(58)	20	(20)	116	61	(53)	17	(15)
Washington University	127	63	(50)	32	(25)	138	73	(53)	18	(13)	135	83	(61)	23	(17)
STATE TOTAL	378	202	(53)	82	(22)	375	211	(56)	83	(22)	490	279	(57)	94	(19)

Institution	1978 Total Grad.	1978 Primary Care Res.	1978 %	1978 P.C. Res. In Mo.	1978 %	TOTAL Total Grad.	TOTAL Primary Care Res.	TOTAL %	TOTAL P.C. Res. In Mo.	TOTAL %
St. Louis University	141	85	(60)	21	(15)	570	324	(57)	117	(21)
UMKC	70	48	(69)	17	(24)	162	106	(65)	49	(30)
UMC	109	55	(50)	21	(19)	431	231	(54)	79	(18)
Washington University	139	84	(60)	23	(17)	539	303	(56)	96	(18)
STATE TOTAL	459	272	(59)	82	(18)	1702	964	(57)	341	(20)

*Family Medicine, Internal Medicine, and Pediatrics
**All Graduates to August 31, 1977

TABLE 5: MISSOURI PHYSICIANS (M.D. and D.O.) BY MISSOURI SCHOOLS OF GRADUATION - 1978*

UNIVERSITY	TOTAL NUMBER OF GRADUATES LICENSED IN 1978	PER CENT OF TOTAL
University of Missouri-C	457	6.6%
University of Missouri-KC	18	0.3%
Washington University	833	12.8%
St. Louis University	822	11.9%
Kansas City College of Osteopathy	380	5.5%
Kirksville College of Osteopathy	433	6.3%
TOTAL	2,973	40.0%

*Source: Missouri Manpower Tables - 1978

4.2 Supply of Dentists in the United States

There were approximately 115,000 active dentists in the United States at the end of 1976; of these 110,000 were civilian dentists in the 50 states and District of Columbia and 5,000 were dentists in the Armed Forces.

In 1976, the median age of active dentists was 41.7 years. This figure is slightly lower than the comparable figure for earlier years of this decade, primarily because of the increase in the number of dental graduates. Almost one-third (36,610) of the active dentists are under 35 years of age, including 16 percent who are under 30 years of age. About one fifth of the active dentists are 55 years of age or over, including 9 percent (10,430) who are age 65 and older.

In 1950 there were some 75,000 active civilian dentists,

providing a ratio of 49.8 dentists per 100,000 population. Even though the number of dentists increased steadily in subsequent years, the dentist-to-population ratio gradually declined until 1965, when it reached a low of 46.5 dentists per 100,000 population. After that year, the unfavorable trend was reversed and the ratio slowly increased, until, by 1976, the dentist-to-population ratio was 51.4, slightly higher than the level in 1950.

The great variation in dentist-to-population ratios among regions and states is very evident. In 1976, among the regions, the Northeast and West had the highest ratios, each with 62 active civilian dentists per 100,000 population, while the South, with 41, had the lowest ratio.

In 1976 there were 1,570 female dentists in the United States representing 1.4 percent of all active civilian dentists. The distribution of female dentists was very uneven, both by geographic division and by state. In addition, a sizable proportion of them work part-time. However, in proportion to their number, the representation of women dentists on the faculty of dental schools is more than three times that of male dentists. In the present decade, there has been a sharp increase in the enrollment of women in dental schools, then both the number and the proportion of female dentists are expected to rise in the future.

The overwhelming majority (nine out of ten) of active dentists practice in a non-institutional setting. There are eight recognized dental specialties, but only 10 percent of the Nation's active civilian dentists are specialists.

Minority group representation among dentists is expected to increase somewhat since the enrollment of minority students in dental schools has shown a fairly steady and consistent increase during the present decade.

The geographic distribution of dentists is a major concern, as more than 80 percent of the counties in the United States have

persons-to-dentist ratios less favorable than the national average of about 2,000 persons per dentist. The average number of dentists per 100,000 population diminishes from a high of 56 for all metropolitan areas to only 26 for counties with a central city of less than 5,000 population.

4.2.1 The Projected Supply of Dentists in the United States

Future numbers of dentists that will be required in the United States have been estimated on the basis of projections of the demand for dental services. Requirements are calculated as the number of dentists who are needed to enable the supply of dental services to keep up with the demand without inflation in the price of dental services.

From the national aggregate point of view, there has been a shortage of dentists in the United States since the mid-1960s, as manifested by a slightly faster rise in the average price of dental services than the rate of increase in the general price level. Inflation in dental prices is due, in large part, to the accelerated growth of dental prepayment plans, which have caused demand for dental services to grow at a faster rate than supply. However, the health manpower legislation of the mid-1960s seems to have anticipated the increased demand very well, and there has been a concurrent increase in the output of dental personnel.

A slight shortage of dentists is projected to persist through 1985, at which time the supply of dental services will begin to catch up with the demand. After 1985, the projected rise in the demand for dental services will continue, but at a reduced rate so that, by 1990, the concurrent steady increase in the number of dentists will bring the supply of services into a non-inflationary balance with the demand under the projected alternative of dental prepayment coverage for 50 percent of the population. Under an alternative projection, with 43 percent of the population covered by 1990, there will not be a shortage, but in fact a slight oversupply of dentists.

Year by year projections of the numbers of active dentists (civilian plus military) show a steady annual increase from 1976 through 1990.

The 1976 number of 115,200 active dentists is projected to increase to 126,240 by 1980, to 140,740 by 1985, and to 154,510 by the end of 1990--an increase of nearly 40,000, or 34 percent more than the number in 1976. Throughout the projection period the net gain in the number of active dentists is accounted for by the entry of about 74,500 dental graduates into the active work force, offset by the loss of about 35,200 active dentists through death and retirement.

The expected supply of 154,510 active dentists in 1990, which is considered the most probable estimate, is based on the assumption that there will be only a slight increase from the 5,280 graduates in 1976 to 5,400 graduates in 1982, and that this level will be maintained through 1990.

4.2.2 Female and Minority Composition of the Supply of Dentists

The enrollment of minority students in dental schools during the 1970s shows a rather steady and consistent increase. First year minority enrollment increased from 412 in the academic year 1971-72 to 650 in 1976-77, an increase of 58 percent. Minority students, as a proportion of all first year dental students, increased from 9 to 11 percent in that period. The actual extent of minority gain is not immediately evident in these percentages, because the over-all first year enrollment also rose 25 percent during this same period. However, the increase in the number of first year minority students was proportionately more than twice the percentage increase in total first year enrollment.

In 1971-72 minority students constituted only 6 percent of the total enrollment in dental schools; by 1976-77 this proportion had increased to 10 percent, or 2,099 students. Although Blacks are by far the largest minority group with 955 students, they still comprise less than 5 percent of the total enrollment

in dental schools. Orientals follow with 3 percent and Mexican-Americans with 1 percent. All other minorities combined constitute another 1 percent of the total enrollment. A breakdown of the 1976-77 enrollment of minority students by class year also shows a steady increase in numbers. In the fourth year class there are 426 minority students; each earlier class has a progressively greater number, with 650 in the first year class. Another significant indication of the extent of the increase in minority students in dental schools is the fact that, 1976, minority graduates constituted 9 percent of all graduates, nearly double the proportion in 1972.

One of the most notable and significant developments in dental education in the 1970's has been the rapid and steep increase in enrollment of women students. In academic year 1976-77, there were 802 female first year dental students, more than an eight-fold increase since 1970. Over this same period, female dental students, as a proportion of all first year enrollments, increased from 2 percent to nearly 14 percent.

The substantial increase in enrollment of women is also evident in the statistics for total dental student enrollment. In academic year 1970-71, there were 231 female dental students, only about 1 percent of the total. In academic year 1976-77, female enrollment totaled 2,349, constituting a full 11 percent of all dental students in the United States. This upward trend is similarly evident in the breakdown of the 1976-77 enrollment of female dental students by class year. Fully one-third of the female dental students are in the first year class. In contrast, women students in the fourth year class represent only one-sixth of the total female enrollment in dental schools. The number of women graduating from schools of dentistry has increased substantially since 1972. In that year, there were only 40 female graduates; in 1976, 248 women were graduated from dental schools in the United States.

4.2.3 Projections of Dental Student Enrollment and Graduates

Student enrollment and the number of dental graduates in the immediate future will increase less rapidly than during the last several years. Increases in recent years are due largely to Federal support for dental school expansion and new school construction and, with the decline in such support, the upward trend of both schools and students is approaching a halt.

Dental student enrollment projections for the next decade indicate that the number of students will remain very close to the 1976-77 level. First year enrollment is projected, after minor fluctuations, to decrease slightly, from 5,935 in 1976-77 to 5,900 in 1978-79. Subsequent first year enrollments are projected to continue at that level, resulting in a stabilization of the number of graduates at about 5,460 by 1981-82. These projected levels for graduates are expected to prevail through the academic year 1989-90.

4.2.4 Dental Education in the United States

The present number of schools of dentistry and their student enrollment represent a considerable increase over the figures for previous decades. The number of dental schools has increased from 42 in 1950 to 59 in 1976. In this same period, total enrollment rose from 11,891 to 21,013 students, an increase of over 75 percent. From the mid-1960s onward, increases in the number of dental schools and in dental enrollment are, in large part, attributable to provisions of the Health Professions Educational Assistance (HPEA) Act, which included provisions for construction of new schools and for expansion of the capacity of existing schools of dentistry. Even though two schools closed in the early 1970s, the opening of new schools has provided a net increase of 10 schools since 1965.

4.2.5 Dental Education in Missouri

There are two schools of dentistry in Missouri: University

of Missouri-Kansas City, School of Dentistry and Washington University, School of Dentistry, St. Louis. Total enrollment of first year dental students in the schools in Missouri is currently 244; 159 at the University of Missouri-Kansas City and 85 at Washington University, St. Louis.

4.2.6 Selected Characteristics of Admissions to University of Missouri-Kansas City and Washington University Schools of Dentistry, 1969-70 through 1973-74

Table 6 provides an indication of the characteristics of first year dental students in Missouri. A larger percentage of the first year classes at the University of Missouri-Kansas City from 1969 to 1974 were Missouri residents than were Washington University students for the same period. A higher percentage of Washington University students were from a metropolitan area than were University of Missouri-Kansas City students. The percentages by sex and race were almost equal for both schools.

4.2.7 Number of First year Students at Missouri Schools of Dentistry 1969-70 through 1977-78

Table 7 indicates the number of first year students at Missouri schools of dentistry 1969-70 to 1977-78.

The enrollments for first year students at the UMKC School of Dentistry has increased from 61 to 85 during the same period of time. The combined first year enrollments has increased from 211 to 244.

4.2.8 Number of Graduates from Missouri Schools of Dentistry 1969-70 through 1975-76

Table 8 indicates the number of graduates of Missouri schools of dentistry from 1970 to 1976. Since 1970, there has been an increase of graduates from 165 to approximately 240 students per year.

4.2.9 Missouri Dentists by Missouri Schools of Graduation - 1978

Table 9 indicates the number of dentists by Missouri

TABLE 6: SELECTED CHARACTERISTICS OF ADMISSIONS TO UNIVERSITY OF MISSOURI-KANSAS CITY AND WASHINGTON UNIVERSITY SCHOOLS OF DENTISTRY, 1969-70 THROUGH 1973-74*

ACADEMIC YEAR	NUMBER OF ADMISSIONS	PERCENTAGE							
		MISSOURI RESIDENTS	NON-MISSOURI RESIDENTS	METRO	NON-METRO	MALE	FEMALE	WHITE	NON-WHITE
		University of Missouri - Kansas City							
1969-70	150	51%	49%	77%	23%	99%	1%	99%	1%
1970-71	150	63%	37%	73%	27%	99%	1%	99%	1%
1971-72	151	66%	34%	77%	23%	100%	0%	100%	0%
1972-73	160	68%	32%	76%	24%	98%	2%	99%	1%
1973-74	160	68%	32%	79%	21%	99%	1%	97%	3%
		Washington University							
1969-70	61	20%	80%	93%	7%	100%	0%	100%	0%
1970-71	64	17%	83%	92.5%	7.5%	100%	0%	99%	1%
1971-72	67	18%	82%	95%	5%	99%	1%	99%	1%
1972-73	70	18%	82%	94%	6%	99%	1%	99%	1%
1973-74	72	18%	82%	98%	2%	97%	3%	99%	1%

Source: Enrollment Report, unpublished manuscript, Office of Comprehensive Health Planning, Health Manpower Planning, January 1976.

*Taken from Lanis Hicks, Lyn Fox, Gayle Lane, Michael Herrick, Missouri Health Manpower Analyses: Dental Manpower, Jefferson City, Missouri, Missouri Department of Social Services, June 1976, p. 62.

TABLE 7: NUMBER OF FIRST YEAR STUDENTS OF MISSOURI SCHOOLS OF DENTISTRY

1969-70 Through 1977-78

UNIVERSITY	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
University of Missouri-KC	150	150	151	160	160	156	159	159	159
Washington University	61	64	67	70	72	84	86 1*	84	85
TOTALS	211	214	218	230	232	240	246	243	244

* Part time student

Sources: Patrick Hurley, Selected Health Occupations - Educational Programs IN Missouri, 1977, Missouri Department of Social Services, Division of Special Services, State Health Planning and Development Agency, Health Manpower Planning

Enrollment Data - Missouri Commission on Higher Education

TABLE 8: NUMBER OF GRADUATES OF MISSOURI SCHOOLS OF DENTISTRY
1969-70 Through 1975-76

UNIVERSITY	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
University of Missouri-KC	117	114	116	141	151	133	146
Washington University	48	52	48	52	57	56	117*
TOTALS	165	166	164	193	208	189	263

* Washington University began a three year graduation program as well as four year program. This total reflects the result of a double graduation.

Sources: Patrick Hurley, Selected Health Occupations - Educational Programs in Missouri, 1977, Missouri Department of Social Services, Division of Special Services, State Health Plannand and Development Agency, Health Manpower Planning

schools of graduation. In 1978 there were a total of 1,863 graduates of Missouri schools of dentistry licensed to practice in the state. This number represents 87% of all the dentists licensed in 1978 for the state.

With respects to the need for an increase in supply of dental practitioners, it is the consensus of the Health Manpower Planning Task Force that Missouri does not have a deficient number of dentists on a state-wide basis. The problem is one of distribution. Hence, while the state as a whole is adequately served, there are areas within Missouri which have a deficiency of dental services.

Based on status quo assumptions, current indications are that additional numbers of dentists will be required to meet the increased demands due to the projected growth in population. Replacement needs due to the age of the dental population do and will exist. However, the two dental schools in Missouri will provide a continued influx of young practitioners into the State of Missouri.

TABLE 9: MISSOURI DENTISTS BY MISSOURI SCHOOLS OF GRADUATION - 1978

UNIVERSITY	TOTAL NUMBER OF GRADUATES LICENSED IN 1978	PER CENT OF TOTAL
University of Missouri-KC	934	43.54%
Washington University	432	20.14%
St. Louis University	497	23.17%
TOTAL	1,863	86.85%

Source: Missouri Manpower Tables - 1978

4.3 Supply of Pharmacists in the United States

While some growth in numbers of pharmacists has taken place in recent years, substantial growth of the profession is

expected in the future. The impact of this growth may be slightly reduced by the fact that an increasing proportion of pharmacy graduates will be women who may be somewhat less likely than male pharmacists to work on a full-time basis. The new HPEA legislation (PL 94-484) states that to be eligible for a grant under Section 770, each school of pharmacy must give assurance that its students will undergo a training program in clinical pharmacy.

There are a number of other developments relating to pharmacy that need to be watched. Foremost is the possibility that the supply of pharmacists may exceed the demand for their services, possibly in the mid-1980s. The current need for additional pharmacists appears less critical than in other health professions, and with the substantial increase in pharmacists projected to take place in the next decade or so a situation could develop in which there may not be enough positions available for future pharmacy graduates, either nationally or in specific areas of the country.

4.3.1 Numbers and Characteristics of Pharmacists

In 1973 there were approximately 116,000 active registered pharmacists in the United States. Some growth, although not substantial, in the numbers of active pharmacists has taken place in recent years. Nearly three-fourths of all pharmacists worked in community pharmacies. Of these, about one-half were in independent establishments, an additional one-fourth were in chain stores, and the remaining one-fourth worked in hospitals, nursing homes, government, education, or manufacturing. Overall, about one-third of the community pharmacists were proprietors and two-thirds were salaried employees. Most of the pharmacists working in hospitals and nursing homes, government, education, or in manufacturing, are probably salaried employees.

The proportion of pharmacists working in independently owned pharmacies has decreased significantly since 1966, when 68.5 percent either owned or worked in an independent community pharmacy. By 1973, this proportion had dropped to 47.0 percent.

The proportion of pharmacy practitioners working in chain pharmacies has risen from 14.0 percent to 26.7 percent during this same period. The percentage of pharmacists employed in hospitals has increased from 8.0 to 14.2 percent since 1966, while the numbers employed by the manufacturing and wholesale industries have remained relatively constant.

4.3.2 Age, Sex Distribution and Minority Characteristics of Pharmacists

The age distribution of pharmacists by practice setting reveals much about the nature of the profession. Among younger pharmacists there appears to be a sharp trend away from independent pharmacies and toward chain pharmacies and hospitals. An increasingly large proportion of pharmacists employed by federal hospitals and chain pharmacies are under 30, while the percentage of young pharmacists practicing in independent pharmacies is much lower. This underscores the general trend away from independent pharmacies, and also may be an indication of preference among recent graduates for the security of an institutional work setting.

The most dramatic trend in pharmacy manpower is the increase in the number and percentage of women entering the profession. In the past, only a very small proportion of practicing pharmacists were female, but pharmacy is now in the midst of a change in the sexual compostion of its human resources pool. For example, in 1950 only 4.0 percent of the active pharmacists were women. By 1970, this percentage had risen to 9.0 percent, and by 1973 to 11.0 percent. This trend is expected to continue for some time because the percentage of women enrolled in the final three years of study in colleges of pharmacy is steadily increasing. In 1963-64, 13 percent of the students in this class were female. By the 1976-77 academic year the proportion of females had risen to 37 percent.

Overall, the percentage of active females in the pharmacy work force is projected to rise from 11.0 percent in 1973, to 19.1 percent by 1980, and to 30.8 percent by 1990.

According to the pharmacy manpower information survey of 1973, only one of every 25 active pharmacists was a member of a minority group. The South Atlantic division had the highest proportion of Black American pharmacists, nearly one-third of whom were located in the District of Columbia. The Pacific Division had the largest proportion of Asian pharmacists, over 14 percent. The majority of Asian pharmacists were concentrated in the States of Hawaii and California, both of which have large Asian populations.

Pharmacists who are members of racial-ethnic minority groups tend to be concentrated in practice locations delivering primary care, that is in community and hospital pharmacies. Looking at the distribution for each racial-ethnic group, a slightly different pattern emerges. For example, black pharmacists tend to be more evenly distributed among the community and hospital categories than are white pharmacists, and Japanese and Chinese pharmacists are more evenly distributed than either of the above two groups.

4.3.3 Projections of the Supply of Pharmacists in the United States

It is projected that future graduating classes will produce a total gross graduate output of 128,820 for the 1974-90 period.

The supply of active pharmacists is projected to grow from 116,562 in 1973 to 144,300 in 1980, and to 185,400 by 1990--an increase of approximately 69,000 pharmacists over the projection period. The percentage of male pharmacists is projected to decrease from 89.0 percent of the total active pharmacists in 1973, to 80.9 percent in 1980, and is expected to further decline to 69.2 percent by 1990.

Although it is difficult to forecast the exact number of pharmacists required in the future, indications are that requirements for pharmacists may not increase as rapidly as supply. However, a number of factors must be taken into consideration

which might mitigate the likelihood that the supply might exceed the requirements for pharmacists.

One measure of requirements for pharmacists is the optimum ratio of 62.5 pharmacists per 100,000 population utilized by the profession. On this basis, 153,200 pharmacists would be required in 1990, as compared with a projected supply of 185,400 in that year. Another method for estimating pharmacy requirements to 1900, utilizing the highest current State ratio of pharmacists to population as a standard, results in an estimated requirement of 173,800 pharmacists in 1990, still somewhat below the projected supply.

Looking more closely at the projected mix of pharmacists by sex in 1990, however, gives a somewhat clearer requirements-supply picture. On this basis, the full-time equivalent supply of active pharmacists will likely be substantially fewer than the actual number of 185,400 pharmacists projected. In that year, the proportion of active women pharmacists may have nearly tripled over current levels, and the aggregate number of women in the profession may have increased more than four-fold. Because of the shorter total working life for women and their relative proclivity toward part-time employment, the number and ratio of full-time pharmacists is expected to be less than the aggragate totals would imply. It is likely, therefore, that supply and requirements for pharmacists will be more closely in balance than would appear initially on the basis of full-time equivalent pharmacists.

4.3.4 Pharmacy Education in the United States

Enrollments in pharmacy schools have grown substantially over the last decade and a half, primarily since the late 1960s. Between the academic years of 1962-63 and 1965-66, third-to-last year enrollments grew only at an average annual rate of less than 3 percent a year. During the period from 1965-66 through 1974-75, following enactment and implementation of the Health Professions Educational Assistance Act of 1963, pharmacy schools experienced

an average annual growth rate three times higher, or nearly 9.0 percent, in third-to-last year enrollments. Beginning in 1975-76, however, enrollments began to decline. In the fall of 1975 there was a decrease of 0.3 percent in third-to-last year enrollments, and a further decline of 6.1 percent in the fall of 1976. This decrease was due to the decrease in male enrollments. Third-to-last year enrollments for males decreased by 941 to 18.9 percent in this two year period, while female enrollments continued to rise, increasing by 415, or 14.7 percent. In 1976, the proportion of women in the third-to-last year class was nearly two-fifths of the total, up from just over one-fifth in 1970.

In the fall of 1976 American students of minority racial-ethnic heritage represented nearly 9.0 percent of the total student population in college of pharmacy, up moderately from recent years. There were 938 Black Americans (4.0 percent of the total enrollment), 725 Asian Americans (3.1 percent), 353 Hispanics (1.5 percent), 37 American Indians (0.2 percent) and 36 others (0.2 percent). The four predominantly minority colleges of Texas Southern, Florida A & M, Xavier and Howard Universities continue to enroll just over one-half of the Black American pharmacy students. Since total enrollments in pharmacy schools appear to be stabilizing, minority enrollments may not increase significantly in the near future.

4.3.5 Pharmacy Education in Missouri

There are two colleges of pharmacy in Missouri: St. Louis College of Pharmacy, St. Louis, Missouri, and the University of Missouri-Kansas City School of Pharmacy, Kansas City, Missouri.

4.3.6 Number of First year Students from Missouri Schools of Pharmacy

Table 10 illustrates the number of first year students who entered Missouri schools of pharmacy from 1969-70 through 1976-77. In 1969-70 the total first year enrollment was 196 and in 1976-77 the total first-year enrollment was 329. This represents

an increase of 68% in the eight year period. Although increases in the first year enrollment are always a possibility, it would appear that the two schools of pharmacy will continue to enroll a total of approximately 330 students for the near future.

4.3.7 Number of Graduates from Missouri Schools of Pharmacy 1969-70 through 1975-76

Table 11 illustrates the number of graduates from the two schools of pharmacy from 1969-70 to 1975-76. The St. Louis College of Pharmacy has had a steady increase in the number of students that graduated for that time period. Specifically they have increased their numbers from 75 to 141. This number represents an increase of 53% in seven years. In 1969-70 the UMKC School of Pharmacy graduated 48 students and in 1976 graduated 62. This difference represents an increase of 29% over seven years. For the entire state the total increase of graduates from 1970 to 1976 was 65%.

4.4 Nursing Manpower Summary

The increase in the number and capacity of the nation's health profession schools from the mid-1960's on has resulted in major increases in the supply of health manpower, with further expansion assured in the coming years. In fact, the number of practitioners in the major health professions is projected to increase from 40 to 70 percent between 1975 and 1990, an increase far in excess of the anticipated population growth during the same period. It is difficult to make categorical statements about health professionals because of the unique characteristics and needs of the various professions. The manpower situation in the state and the nation as related to nursing does not parallel that of medicine. The data indicate that there is still a shortage in actual number of nurses active in the profession and a significant shortage in nurses with preparation at the baccalaureate and higher degree levels. The position of nursing within the health

TABLE 10: NUMBER OF FIRST YEAR STUDENTS OF MISSOURI SCHOOLS OF PHARMACY
1969-70 Through 1976-77

UNIVERSITY	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
University of Missouri-KC	47	74	96	114	85	80 4* 84	82 6* 88	81 8* 89
St. Louis College Of Pharmacy	149	200	224	226	220	224	232 5* 237	240
TOTALS	196	274	320	330	305	308	325	329

*Part time Students

Sources: Patrick Hurley, Selected Health Occupations - Educational Programs in Missouri, 1977, Missouri Department of Social Services, Division of Special Services, State Health Planning and Development Agency, Health Manpower Planning
Enrollment Data - Missouri Commission on Higher Education.

TABLE 11: NUMBER OF GRADUATES OF MISSOURI SCHOOLS OF PHARMACY
1969-70 Through 1975-76

UNIVERSITY	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
University of Missouri-KC	48	43	67	54	84	63	62
St. Louis College of Phar.	75	90	106	125	124	133	141
TOTALS	123	133	173	179	208	196	203

Source: Patrick Hurley, Selected Health Occupations - Educational Programs in Missouri, 1977, Missouri Department of Social Services, Division of Special Services, State Health Planning and Development Agency, Health Manpower Planning

care system is changing. Projected demands for nursing far exceed the supply at a time when there is no indication the supply will increase above present inadequate levels. There has been a pattern of slight decline or little growth in nursing evident since 1973; this stable growth rate is seen in the number schools as well as the number of graduates as shown in Table 12.

TABLE 12: NUMBER OF BASIC RN PROGRAMS, GRADUATIONS AND ADMISSIONS

	BASIC RN				
YEAR	NUMBER OF SCHOOLS	NUMBER OF PROGRAMS	PERCENT CHANGE	#GRADUATIONS	#ADMISSIONS
1969	1313	1324	+3.6	43,103	74,598
1970	1330	1340	+1.2	46,455	78,524
1971	1338	1349	+0.7	51,304	93,344
1972	1350	1350	+1.0	58,881	103,789
1973	1348	1360	-0.1	67,061	107,344
1974	1347	1358	-0.1	73,915	109,020
1975	1349	1362	+0.3	77,065	112,174
1976	1337	1358	-0.3	77,765	112,523
1977	1339	1356	-0.1	-	-

These data would suggest that there will not be a substantial increase in the supply of nursing manpower and any social changes (population increase, national health insurance, role reformulations) can be expected to increase the existing shortage. While future requirements for health professionals cannot be predicted with any degree of certainty, there is little doubt that by 1990 the substantial increase in supply of health manpower "should

bring requirements and supply of most health professions into closer balance than at any time in the nation's history. No severe shortages are foreseen in any health manpower category in 1990. In a few categories the projected supply may somewhat exceed projected requirements..."[1]

There is every indication that the national situation is paralleled on the state level. Missouri's health profession schools (Medicine, Pharmacy, Dentistry, Nursing) appear to be fully capable of producing the number of graduates necessary to satisfy state needs. Although there are adequate numbers of schools of nursing, limited resources have not made it possible to meet the demand for nurses. A number of these programs are not accredited.

Manpower data would seem to indicate an adequate supply of nurses prepared at the LPN, AD, diploma levels with a real shortage of nurses prepared at the baccalaureate and higher degree level. However, employers of nurses within the state continue to experience significant shortages of qualified nurses.

There is growing pressure for advanced graduate training (including the doctoral degree in the nursing profession.) Data shows, moreover, that the state benefits from the influx of health professionals trained in nearby states who compensate for Missouri-trained graduates and residents leaving the state upon completion of their education.

A shortage in the aggregate supply of health professionals, therefore, is not the problem. In addition to questions pertaining to quality of care, availability of primary care, improvement of health care status, the educational system, representation of women and minorities in the health professions, and health care cost, an area of major concern has been the geographic distribution of health practitioners; or, more specifically, the prevailing maldistribution of practitioner supply in rural and inner city areas. Improvement

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(1) DHEW. A Report to the President..., August, 1978, (HRA) 78-93, p. I-2.

of this situation is the overriding objective of the Area Health Education Centers.

The distribution problem related to nursing is somewhat different. The shortage of nurses is not unique to rural and inner city areas. There is a real shortage of nurses prepared at the baccalaureate and higher degree levels (a qualitative maldistribution). Nurses have historically been concerned with the provision of care to the poor or those in greatest need. This socialization focus continues and is different than that of the medical profession. This difference in socialization causes us to question the assumption that because medicine does not go to rural areas nursing would not were we appropriately prepared and allowed to function.

A considerable amount of material has been gathered which offers data relative to the existing and projected supply of health manpower per se, with the basic findings being those referred to above. Each section consists of three parts dealing with (a) the national scene, (b) the condition in the state, and (c) education and training. It should be noted that (a) and the first (national) part of (c) consist primarily of excerpted passages from DHEW's A Report to the President and Congresss on the Status of Health Professions Personnel in the United States, August, 1978. Data dealing with (a) and (c) are primarily excerpted from NLN's Nursing Data Book, 1978 and WICHE's Analysis and Planning for Improved Distribution of Nursing Personnel and Services Panel of Expert Consultants Final Report. Section (b) is similarly primarily comprised of quoted excerpts from Missouri Health Manpower Analyses: Summaries, Conclusions, Recommendations by Lyn Fox, Lanis Hicks, Gayle Lane, Office of Comprehensive Health Planning, June, 1976.

4.4.1 Nursing Supply

4.4.2 The National Picture

Nursing comprises the largest group of health workers (821,500 FTE RN's, 1976) in this country. Data is presented here showing the distribution of these nurses as to level of education and field of employment. (Tables 13 and 14.) The adequacy of

TABLE 13: FTE NURSING PERSONNEL, 1976

(Active)

1976 FTE

RNs	
Graduate	30,400
Baccalaureate	142,500
AD and Diploma	648,600
Total	821,500
LPNs	429,600
Aides	936,800
Total	2,187,900

TABLE 14: FTE - RNs BY FIELD OF EMPLOYMENT, 1972*

Hospitals	440,600
Nursing Homes	43,000
Community Health	36,900
School Health	27,200
Occupational Health	18,300
Physicians' Offices	43,900
Nursing Education	27,500
Private Duty	27,500
Other	3,600
Total	668,500

*Most recent data available

this supply is unemployment rate. Presently in nursing the unemployment rate is 2.0%, well below the national level. Further, the growth rate, as shown in Table 12 would suggest there will not be an oversupply of nursing personnel in the foreseeable future. Any changes in the health care system is likely to increase the need and worsen the supply situation.

Data on the number of unfilled, budgeted positions in all employment fields is not available. Data is available in the field of nursing education where in 1978 there were 800 vacant nurse-faculty budgeted positions (no consideration is given to appropriateness of qualifications of those employed.)[2] The picture is further complicated by the fact that at any given time a large segment of the licensed RNs are not employed or seeking employment. In 1974 only 69.6% were employed in nursing with only 44.5% employed full-time. Twenty-eight percent are not employed and not seeking positions. Many of these part-time and not employed RNs will eventually return to the marketplace, necessitating refresher learning experiences. Many of these are permanently lost because of a variety of social values and personal factors.

The Nurse Training Act of 1975 (PL 94-63, Section 951) mandated that information on current and projected supply, distribution and requirements for nurses be furnished to Congress. The reports of two major studies have recently been published.[3],[4]

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(2) NLN Nursing Data Book. 1978 (NLN Pub. No. 19-1751).

(3) Analysis and Planning for Improved Distribution of Nursing Personnel and Services Panel of Expert Consultants: Final Report. Jean L.J. Lum with Gregoary Leonhard, Western Interstate Commission for Higher Education, Boulder, Colorado, June, 1978.

(4) Impact of Health System Changes on the Nation's Requirements for Registered Nurses in 1985. Vector Research, Inc. Ann Arbor, Michigan, Timothy C. Doyle, Ph.D. Program Director. Report published by USDHEW (No. HrA78-9), 1978.

Both of these studies project a need for increased number of nurses, even with no major changes occurring within the health care system. One study particularly notes the need for increased numbers at the baccalaureate and higher degree levels. Data from these studies is presented in Section 5.0

4.4.3 Missouri

The Missouri Center for Health Statistics data related to registered nurses shows the typical active registered nurse is a white married female under the age of 40. She graduated from a diploma program in Missouri and is currently working as a staff nurse in a hospital in one of the metropolitan areas. Tables 15 and 16 show the distribution of active registered nurses. Only two-thirds (68%) of active RNs received their basic education in Missouri. Table 17 shows the distribution of RNs throughout the state.

It is important to note the activity status. While there are 25,048 licensed nurses in Missouri, there are about 17,200 active FTE-RNs. The number of FTE-RNs per 10,000 population is lower than that indicated in Table 17. An ideal FTE: population ratio has not been established. The US ratio for employed (not FTE) RNs, 1972, was 38.0 with a range from 19.0 in Arkansas to 64.9 in Massachusetts. Missouri's ratio was 31.2.

There are thirty-four schools in Missouri preparing registered nurses. Of the 34 schools, 7 offer programs leading to a generic baccalaureate degree, 13 leading to a diploma from a hospital school and 14 leading to an associate degree. The programs produce over 1700 graduates per year. (Diploma = 52%, ADN = 30%, BSN =18%.) The incompatibility of data bases makes comparison difficult, but it would appear that about as many nurses emigrate to Missouri as leave each year. In 1977 there were 1251 newly licensed RNs in Missouri. This would seem to indicate that approximately 450 graduate nurses do not become licensed in Missouri (26%) as compared to 32% of Missouri Active RNs who were educated outside of the state.

In addition to these 34 schools there are a few schools which offer only baccalaureate programs to registered nurses. None of these are accredited.

Master's degrees in nursing are offered in two of the schools offering baccalaureate degrees (UMC and St. Louis University). In addition, UMKC offers only a master's degree program. None of the schools offer the doctoral degree.

There is no accurate data on the number of nurses engaged in primary care or the number of formally trained to provide primary care.

4.4.5 Projections of supply

There is no data available projecting supply. Examination of the data presented in Table 12 clearly shows a no-growth situation. At the present time there is nothing occurring which would indicate an increase in projected supply.

5.0 Health Manpower Distribution and Needs Assessment

5.1 Geographic and Specialty Manpower Distribution

The geographic distribution of health manpower is one of today's most complex and important issues facing health care planners, policy-makers, and providers.

There is significant overlap among the issues of manpower supply and distribution by geographic areas. Increasing the total supply of health manpower will not guarantee the amelioration of the geographic distribution problems found in the system, assuming that the factors underlying geographic distribution remain unchanged. The degree of unequal geographic distribution varies among health care specialties and reflects a variety of causes. Two interacting factors which account, in part, for geographic distribution are population density and community wealth. Not surprisingly, physician distribution also parallels the distribution of hospital beds and per capita income.

Among physicians, geographic distribution is more even for family practitioners.[1] Survey data on family practice physicians show that about a third indicate a preference for practice in small communities and in non-SMSA counties. Therefore, if family practice continues to grow at its present rate, its distribution may become similar to that of general practice. At present, annual additions of family practitioners are less than losses of general practitioners. It is interesting to note that during 1976, 54.9 percent of general and family physicians were located in cities with populations of 30,000 or less, and 11.1 percent in cities with populations between 2000 and 5000.

Physician distribution are also viewed at the county level. As Table 18 indicates, the proportion of non-federal M.D.s in

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(1) D.J. Ostergaard, "Preliminary Report on a Survey of 1976 Family Practice Residents," American Academy of Family Practice, August, 1976.

1976 in metropolitan counties was more than six times that in non-metropolitan counties, as compared with 1963, when it was almost four times as high. Similarly, while the physician per 100,000 population ratio for all counties has increased from 120.3 in 1963, to 137.4 in 1976, the ratio has increased in nonmetropolitan counties from 73.8 to 74.4. Likewise, the proportion of M.D.s in nonmetropolitan counties compared to metropolitan counties declined from 20.9 to 13.4 percent over the same period of time.

The disparity of the physician supply between urban and rural counties is further illustrated by the fact that in 1975, 87.1 percent of all non-federal physicians were located in the nation's 300 major metropolitan counties. Within these areas there are far more doctors in the suburbs and affluent urban areas than in the central city. On the other hand, there are 145 counties (most of them sparsely populated) which have no active M.D.s. Furthermore, nonmetropolitan areas have had higher proportions of older physicians than the nation as a whole.(2)

The geographic distribution of physicians is also in part, related to the uneven national distribution of osteopathic physicians who, in some states, represent a sizeable component of total physician manpower. In 1977, D.O.s were distributed unevenly among the states primarily because until recently they were not allowed complete practice privileges in many states. The largest number (2,760) was in Michigan with only seven in Alaska. In over twenty states there were less than a hundred osteopathic physicians and students in 1977. The distribution of active D.O.s among the states may well become more uneven within the next few years because in many states, high proportions of these physicians are over 65. As a result of this uneven distribution, the ratios of active non-federal osteopathic physicians per civilian population range from

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(2) G.A. Roback, Distribution of Physicians 1963, AMA, Chicago, 1964, and subsequent annual editions.

0.1 per 100,000 in Mississippi to 26 per 100,000 in Michigan with the U.S. average being 6.4 per 100,000.[3] However, within the states in which D.O.s are concentrated they are relatively evenly distributed among communities of different size. Similarly, the specialty distribution of active non-federal D.O.s also tends to be fairly even among communities of various sizes.[4]

Many factors contribute to the current distribution of physicians by specialty. Among the most important are relative prestige within the profession, differential rewards (both financial and other), available role models during the educational process, etc.

Once established in a specialty, physicians rarely change to another area. Therefore, the choice of residency training is a critical one in terms of specialty distribution.[5] Elsewhere in this report (Section 4.0, Table 4) we present data on the percentage of graduates of Missouri medical schools who select residency training in primary care fields.

Among the factors which relate to physician distribution by specialty are the requirements of many practitioners for expensive and sophisticated equipment, institutional support services, and dependence upon referrals for many of the physician's patients. The specialist also requires a large population base containing a sufficient number of persons with diseases who seek such specialty services. The existence of a large population base provides for cost effectiveness while maintaining proficiency of the specialist. In general, the specialties with the largest number of practitioners, with the exception of psychiatry, are more evenly distributed than

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(3) American Association of Colleges of Osteopathic Medicine, Personal communication, October, 1976 and August, 1977.

(4) M.E. Altenderfer, Osteopathic Physicians in the United States, DHEW Publication No. (HRA) 75-60, 1975.

(5) During the period of residency training substantial attrition may occur from programs in general internal medicine, general pediatrics, and general surgery as residents elect to pursue sub-specialty training. As a result, not all students who elect general medicine or general pediatrics will become primary care physicians.

the sub-specialties, which are concentrated in the urban referral centers. However, there are some urban areas in which shortages of these latter specialists do exist.

Distribution of specialists by state can be viewed from two aspects: first, by the proportion that the specialty comprises of all patient care physicians and second, by the population ratio that exists for that specialty. In densely populated states, specialists tend to be high in both counts, but the opposite holds true for general practitioners who exhibit both higher physician to population ratios and higher proportions in sparsely populated states. The situation is still different for other primary care physicians. While primary care M.D.s tend to represent a higher proportion of patient care M.D.s in the sparsely populated states, the ratio to population still tends to be low. Internists, pediatricians and obstetricians all have ratios below the national average in these areas. Thus, it is the high proportion of general practitioners that causes the aggregate proportion of primary care M.D.s to be higher in rural areas.

A similar, but not identical, situation exists in the other health disciplines. Dentists, like physicians, are typically self-employed and thus exercise a large degree of personal choice in their practice location. As with medicine, specialty and sub-specialty career choices are attractive to an increasing number of young dentists and hence the same general factors which influence the distribution patterns of physicians are operative in dentistry.

Most nurses and associated health professionals are not self-employed, but are employees of service of provider institutions.[6] Therefore, the distribution pattern of these professions is heavily influenced by the distribution of employment opportunities. Because

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(6) This is not always true, especially among certain categories of therapists and technicians who may be self-employed and have a contractual relationship to a service or provider institution. But the factors which affect distribution of these professionals are probably not changed by these exceptions.

professionals in these disciplines cannot generally practice independently from physicians or dentists,[7] their pattern of distribution is responsive to the pattern of physician and dentist distribution.

Pharmacists may be either self-employed or employees; both situations are common. Also, pharmacists are intermediated in their relationship to other health disciplines. On the one hand, they are dependent upon the availability of physicians and dentists (since pharmacists do not prescribe), yet the relationship between a pharmacist and a prescribing physician or dentist is usually mediated by the decision of the patient and so may be highly independent. Therefore, the distribution pattern of pharmacists is influenced to some degree by all of the factors discussed above.

5.2 Physician Manpower Data Available for Analyses[8]

The 1975-76 licensure questionnaire distributed by the State Center for Health Statistics, Division of Health, State of Missouri in cooperation with the State Board of Registration for the Healing Arts provided the following information utilized in these analyses:

1. Primary practice location of licenses physicians,
2. Activity status of licenses physicians,
3. Date of birth of active physicians,
4. Primary specialty of active physicians as determined by the individual, and
5. Number of hours spent in direct patient care activities as determined by individual.

The above data were verified and completed in a joint effort

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(7) The Code of Ethics of the American Physical Therapy Association, for example, requires that patients be treated only upon physician referral.

(8) Taken from Lanis Hicks, Gayle Lane, Lyn Fox, and James Summers. Missouri Health Manpower Analyses: Physician Manpower Jefferson City, Missouri: Missouri Division of Social Services, April, 1976. p. 99.

by the Office of Health Manpower Planning and the Department of Rural Development, University of Missouri-Columbia.

Data concerning the average productivity of physicians were obtained from the American Medical Association's The Profile of Medical Practice: 1974. In this report, productivity is defined as the average number of office visits provided per year by a physician. This productivity figure is provided for each of the primary care specialties (general and family practice, internal medicine, pediatrics, obstetrics and gynecology, and general surgery). All other specialties are aggregated into one average productivity figure. This productivity is also adjusted for the age of the active physician.

Data on the utilization of physicians by the population in age/sex increments were obtained from the American Medical Association's Socio-Economic Issue of Health: 1974. Utilization is defined as the average number of times a person visits a physician annually by age and sex. This total utilization is further refined by division into annual visits to a primary care physician and annual visits to a specialist.

5.2.1 Determination of Present Requirements for Physician Services in Missouri

Arthur Young's Resource Gap Allocation Process was applied to each Primary Health Care Area (PHCA) in the manner outlined in Appendix A. Table 18 displays the scores received by each Primary Health Care Area. The closer the score is to 100 points, the greater its requirement for primary physician services. (See Map A for geographic location of these Primary Health Care Areas.)

In examining Table 19, it is apparent that the Primary Health Care Areas of Columbia, Kirksville*, Jefferson City, Louisiana,

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* Even when the interns and residents in primary care specialties are excluded from the analysis, these Primary Health Care Areas receive negative Resource Gap Scores and, therefore, do not appear to require additional primary care physician services.

TABLE 18

Non-Federal Physicians (M.D.) Providing Patient Care in Metropolitan and Nonmetropolitan Areas 1963-76

Year	All Counties	Metropolitan 1/	Nonmetropolitan 1/
	Number of Physicians		
1963.....	225,427	178,403	47,024
1970.....	252,778	206,676	46,102
1976.....	294,730	255,102	39,628
	M.D.s per 100,000 Population		
1963.....	120.3	144.2	73.8
1970.....	124.2	148.7	71.5
1976.....	137.4	158.2	74.4
	Percent of M.D.s		
1963.....	100.0	79.1	20.9
1970.....	100.0	81.8	18.2
1976.....	100.0	86.6	13.4

1/ For 1963, metropolitan counties include those in SMSAs on basis of 1962 population and nonmetropolitan counties include those adjacent to metropolitan counties and isolated rural and semi-rural counties.

For 1970-76, metropolitan counties include those in SMSAs on basis of 1967 population and nonmetropolitan counties include potential metropolitan counties and all others outside SMSAs.

Source: Annual Reports on Distribution of Physicians in the U.S. by the American Medical Association, Chicago, 1963-1977.

TABLE 19: RESOURCE GAP SCORES RECEIVED BY EACH PRIMARY HEALTH CARE AREA (9)

PRIMARY HEALTH CARE AREA	SERVICES GAP SCORE	POVERTY LEVEL SCORE	TOTAL RESOURCE GAP SCORE	RANK (Best to Worst)	RANK (Excluding Interns and Residents)
Columbia PHCA	-146.94 (-31.00)*	0	-146.94 (-31.00)**	1	5
Kirksville PHCA	-72.07 (-59.04)*	8	-64.07 (-51.04)**	2	1
Jefferson City PHCA	-51.97	1	-50.97	3	2
Louisiana PHCA	-40.13	5	-35.13	4	3
Sedalia PHCA	-37.04	5	-32.04	5	4
St. Louis PHCA	-19.15 (5.00)*	0	-29.15 (5.00)**	6	26
Kansas City PHCA	-27.34 (-19.40)*	0	-27.34 (-19.40)**	7	9
Springfield PHCA	-30.20	3	-27.20	8	6
Clinton PHCA	-31.11	8	-23.11	9	7
Trenton PHCA	-29.66	8	-21.66	10	8
Chillicothe PHCA	-21.05	4	-17.05	11	10
Rolla PHCA	-20.57	4	-16.57	12	11
Joplin PHCA	-15.91	4	-11.91	13	12
Mexico PHCA	-15.57	4	-11.57	14	13
Macon PHCA	-17.53	6	-11.43	15	14
Eldon PHCA	-20.27	9	-11.27	16	15
Poplar Bluff PHCA	-30.85	20	-10.85	17	16

continued . . .

(9) Taken from Lanis Hicks, Gayle Lane, Lyn Fox, and James Summers. Missouri Health Manpower Analyses: Physician Manpower, Jefferson City, Missouri: Missouri Division of Social Services, April, 1976. p. 106-107.

TABLE 19: RESOURCE GAP SCORES RECEIVED BY EACH PRIMARY HEALTH CARE AREA (continued)

PRIMARY HEALTH CARE AREA	SERVICES GAP SCORE	POVERTY LEVEL SCORE	TOTAL RESOURCE GAP SCORE	RANK (Best to Worst)	RANK (Excluding Interns and Residents)
Cameron PHCA	-12.69	3	-9.69	18	17
Farmington PHCA	-17.11	8	-9.11	19	18
Branson PHCA	-18.23	11	-7.23	20	19
Cape Girardeau PHCA	-8.29	4	-4.29	21	20
St. Charles PHCA	-3.24	0	-3.24	22	21
Warrensburg PHCA	-1.32	1	-0.32	23	22
Hannibal/Quincy PHCA	.02	3	3.02	24	23
Perryville PHCA	-2.96	7	4.04	25	24
Washington/ Sullivan PHCA	3.89	1	4.89	26	25
Tarkio PHCA	2.21	5	7.21	27	27
St. Joseph PHCA	8.39	0	8.39	28	28
Salem PHCA	-7.90	17	9.10	29	29
Marshall PHCA	6.38	4	10.38	30	30
Maryville PHCA	9.49	4	13.49	31	31
Monett PHCA	5.97	8	13.97	32	32
Lebanon PHCA	8.94	10	18.94	33	33
West Plains PHCA	1.93	19	20.93	34	34
Nevada PHCA	11.46	10	21.46	35	35
Sikeston PHCA	6.14	16	22.14	36	36
Harrisonville PHCA	20.40	2	22.40	37	37
Bethany PHCA	15.36	12	27.36	38	38
Unionville PHCA	9.80	10	28.80	39	39
Festus PHCA	29.30	0	29.30	40	40
Moberly PHCA	23.06	7	30.06	41	41
Kennett PHCA	10.18	20	30.18	42	42
Bolivar PHCA	17.62	17	34.62	43	43
Caruthersville/ Hayti PHCA	15.65	20	35.65	44	44
Ironton PHCA	19.44	18	37.44	45	45
Waynesville PHCA	33.71	4	37.71	46	46
Kahoka PHCA	30.21	10	40.21	47	47
Mt. Grove PHCA	24.78	19	43.78	48	48
Anderson PHCA	42.80	15	57.80	49	49
Mt. Home, AR PHCA[1]	63.88	20	83.88	50	50

*Services Gap Score excluding interns and residents in the primary care specialties

**Total Resource Gap Score excluding interns and residents in the primary care specialties

[1]Since this Primary Health Care Area crosses Missouri State boundaries, it is difficult to truly determine the manpower situation. All analyses have been conducted utilizing Missouri data only.

TOTAL RESOURCE GAP SCORES - PRIMARY CARE PHYSICIANS

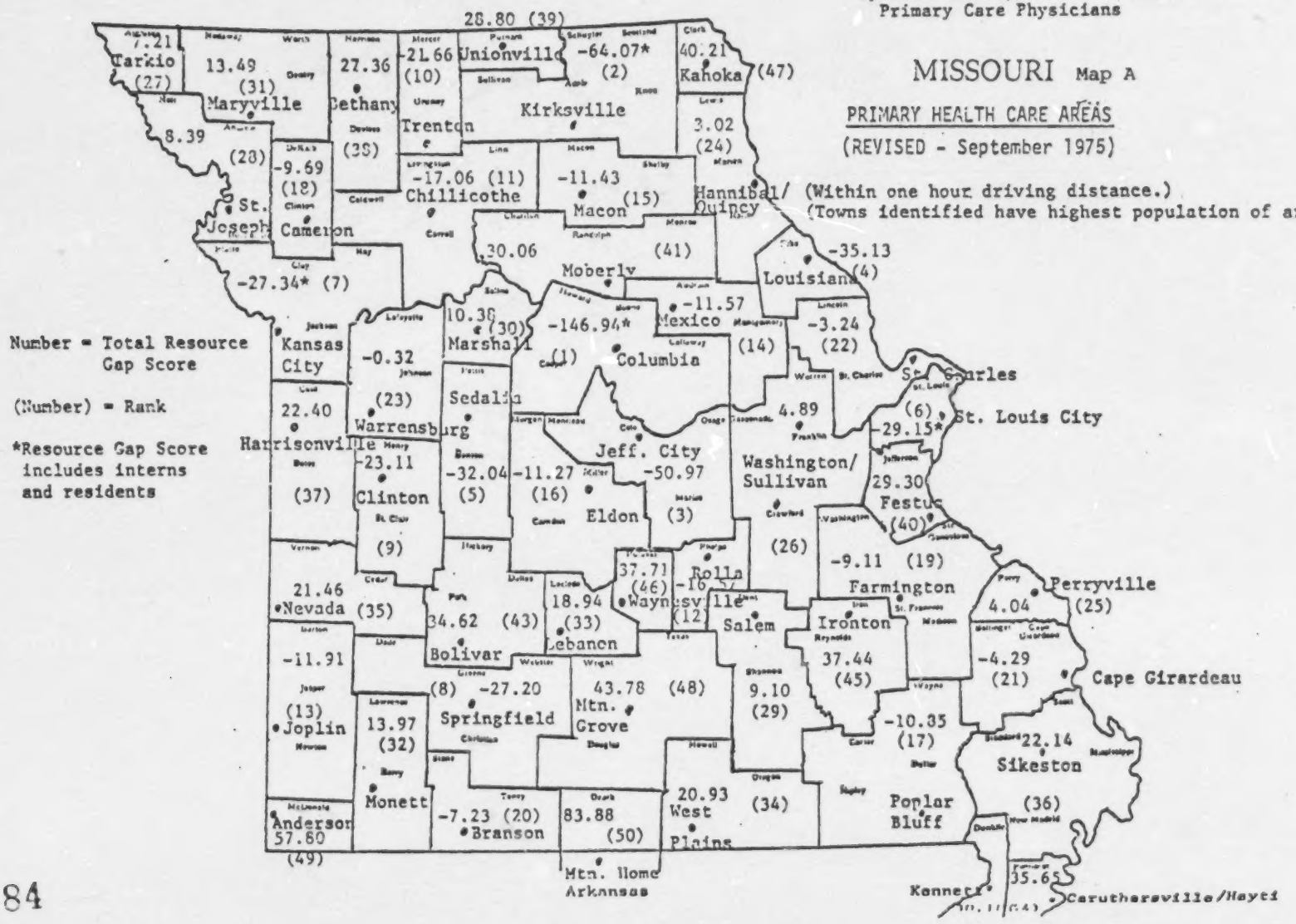
Total Resource Gap Scores and Ranks Received
By Each Primary Health Care Area for
Primary Care Physicians

MISSOURI Map A

PRIMARY HEALTH CARE AREAS

(REVISED - September 1975)

(Within one hour driving distance.)
(Towns identified have highest population of area.)



Number = Total Resource Gap Score

(Number) = Rank

*Resource Gap Score includes interns and residents

Sedalia, St. Louis, Kansas City* , Springfield, Clinton, Trenton, Chillicothe, Rolla, Joplin, Mexico, Macon, Eldon, Poplar Bluff, Cameron, Farmington, Branson, Cape Girardeau, St. Charles, and Warrensburg, have no requirement for additional primary care physician services in that their Total Resource Gap Score is below zero. In fact, these 23 Primary Health Care Areas actually have the capacity to provide more services than are necessary for their respective populations (based on national utilization and productivity rates.)

In determining if the state of Missouri as a whole requires additional primary care physicians, the entire population of the state as well as the total number of active, full-time equvalent, direct patient care, primary physicians** and the total number of available primary physician's assistants and primary nurse practitioners were considered. According to the population's utilization rate of primary care physician services mentioned above, the state of Missouri requires 16,774,975 primary care visits per year. Using the productivity rate for primary care physicians by age and employment of physician's assistants and nurse practitioners mentioned above, Missouri's full-time equivalent, primary care physician population supplies 21,029,940 visits per year. Therefore, based on national utilization and productivity figures, Missouri has the capacity to produce more primary care physician services than are required by its population. However, Missouri is unique in that it is bordered by eight states. In this analysis, neither their populations nor resources are taken into consideration.

Even though the state as a whole does not require additional primary care physician services, there are 27 Primary Health Care

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* When interns and residents in the primary care specialties are excluded from the analysis, the St. Louis Primary Health Care Area does receive a positive Resource Gap Score and, therefore, does appear to require additional primary care physician services. Because of the unique problems of this large metropolitan area, it has not been considered in the rest of the analysis. Please refer to Appendix D for further information concerning the primary care situation in St. Louis.

** Including interns and residents in the primary care specialties.

Areas within the state which do require additional primary physician services. The physicians required within these 27 Primary Health Care Areas are in fact practicing within the state. Hence, Missouri does not have a problem associated with numbers of physicians. The nature of the problem is distribution. Table 20 shows the 27 Primary Health Care Areas which do require additional primary care physician services and the number of primary care physicians necessary to fulfill this deficiency. In performing the calculations, it was necessary to determine what percentage of a full-time equivalent primary care physician would warrant an additional physician. It was decided if the calculations for additional primary care physicians yielded a requirement between .5 and .9, an additional physician was warranted; but if the calculations yielded a requirement of .1 through .4, an additional physician was not warranted.

It would appear that the Primary Health Care Area of Anderson has the greatest requirement for additional primary care physician services and, therefore, should be the focal point of recruitment efforts. The other 26 Primary Health Care Areas listed in Table 20 require emphasis for the addition of primary care physicians in the order in which they are ranked with the Hannibal/Quincy PHCA requiring the least attention. It should be pointed out that even though there are Primary Health Care Areas which require a larger number of primary care physicians than the Anderson Primary Health Care Area, it has a greater need for additional services because a smaller percentage of its population is now being covered by primary physician services.

5.2.5 Conclusions

Missouri does not have a problem associated with the number of physicians on a statewide basis. If health manpower planning continues to concentrate on only increasing the total number of physicians in Missouri, the problem will never be solved. The nature of the problem in Missouri is one of distribution. Hence, while the state as a whole has a more than adequate supply of

TABLE 20: RESOURCE GAP SCORES RECEIVED BY EACH PRIMARY HEALTH CARE AREA WITH REQUIREMENTS FOR ADDITIONAL PRIMARY PHYSICIAN SERVICES; RANK; ADDITIONAL NUMBER OF PRIMARY CARE PHYSICIANS UNDER 31 REQUIRED (10)

PRIMARY HEALTH CARE AREA	TOTAL RESOURCE GAP SCORE	RANK (Best to Worst)	ADDITIONAL PRIMARY CARE PHYSICIANS UNDER 31 REQUIRED*
Hannibal/Quincy PHCA	3.02	24	1
Perryville PHCA	4.04	25	0
Washington/Sullivan PHCA	4.89	26	3
Tarkio PHCA	7.21	27	0
St. Joseph PHCA	8.39	28	6
Salem PHCA	9.10	29	1
Marshall PHCA	10.38	30	2
Maryville PHCA	13.40	31	3
Monett PHCA	13.97	32	4
Lebanon PHCA	18.94	33	2
West Plains PHCA	20.93	34	4
Nevada PHCA	21.46	35	4
Sikeston PHCA	22.14	36	13
Harrisonville PHCA	22.40	37	8
Bethany PHCA	27.36	38	3
Unionville PHCA	28.80	39	1
Festus PHCA	29.30	40	18
Moberly PHCA	30.06	41	8
Kennett PHCA	30.18	42	6
Bolivar PHCA	34.62	43	7
Car./Hayti PHCA	35.65	44	6
Ironton PHCA	37.44	45	4
Waynesville PHCA	37.71	46	5
Kahoka PHCA	40.21	47	2
Mt. Grove PHCA	43.78	48	11
Anderson PHCA	57.80	49	5
Mt. Home, AR PHCA[1]	83.88	50	3
Total Primary Care Physicians			130

*Primary Care Physicians are those in the specialties of general and family practice, internal medicine, pediatrics, obstetrics and gynecology, and general surgery.

[1]Since this Primary Health Care Area crosses Missouri State boundaries it is difficult to truly determine the manpower situation. All analyses have been conducted utilizing Missouri data only.

(10) Taken from Lanis Hicks, Gayle Lane, Lyn Fox, and James Summers. Missouri Health Manpower Analyses: Physician Manpower, Jefferson City, Missouri: Missouri Division of Social Services, April, 1976. p. 110.

physicians, there are areas which have a deficiency of physicians. Consequently, methods must be devised which will attract physicians to these deficient areas or will transport the patients in these deficient areas to the physicians.

But, it must be remembered that the analyses performed were based upon the "needs" of the population, not its "wants." In so doing, this ignores the fact that high income individuals have "wants" for health services beyond those actually needed. Under our present system of health care delivery, the medical and osteopathic professions cater to these "wants." Therefore, physicians in these areas identified as having a more than adequate amount of services are, in part, meeting these "wants."

5.3 Dental Manpower Data Available for Analyses[11]

The 1975-76 licensure questionnaire distributed by the State Center for Health Statistics, Division of Health, State of Missouri, provided the following information utilized in these analyses:

1) Primary practice location of licensed dentists,
2) Activity status of licenses dentists,
3) Date of birth of licenses dentists,
4) Specialty of licenses dentists,
5) Amount of time spent annually in direct patient care activities,
6) Practice location of dental hygienists, and
7) Activity status of dental hygienists.

The Missouri Dental Association conducted a sample survey of dentists in March 1976, which provided estimates of the number and distribution of active chairside dental assistants in Missouri.

A verification process conducted by Health Manpower Planning, Office of Comprehensive Health Planning, provided information on secondary practice location of active licensed dentists in the state

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(11) Taken from Lanis Hicks, Lyn Fox, Gayle Lane, Michael Herrick Missouri Health Manpower Analyses: Dental Manpower, Jefferson City, Missouri, Missouri Department of Social Services, June 1976, p. 99.

of Missouri.

Data concerning the productivity of dentists by age and specialty were obtained from the 1973 Survey of Dental Practice by the American Dental Association. Data on the utilization of dental services by the population by age groups were obtained from the Current Estimates from the Health Interview Survey by the United States Department of Health, Education, and Welfare.

In this report, productivity is defined as the average number of patient visits provided annually. This information is provided by age and specialty of dentists. Utilization is defined as the average number of dental visits per year. This information is provided by age groups.

Using the Decennial Census Data for Selected Health Occupations: United States, 1970, it was estimated that the productivity rates of dentists being used, already included the increase in productivity due to the employment of an average of 1.25 dental auxiliary personnel (chairside dental assistants and dental hygienists.) This information was used to adjust annual visits provided for areas indicating they did not employ the average number of auxiliary personnel.

5.3.1 Determination of Present Requirements for Dental Services in Missouri by Primary Health Care Area

Arthur Young's Resource Gap Allocation Process was applied to each Primary Health Care Area (PHCA) in the manner outlined in Appendix B. Table 21 shows the scores received by each Primary Health Care Area. Again, the closer the score is to 100 points, the greater the requirement for dental services. (See Map B for geographic location of these Primary Health Care Areas.)

In examining this table, it can be seen that the Primary Health Care Areas of Springfield, Kansas City, Joplin, Lebanon, St. Louis, Rolla, Cape Girardeau, and St. Charles do not require additional dental services in order to bring them to a level comparable to that of the nation. In fact, their negative scores indicate they are currently above the national average.

TABLE 21: RESOURCE GAP SCORES RECEIVED BY EACH PRIMARY HEALTH CARE AREA (12)

PRIMARY HEALTH CARE AREA	SERVICES GAP SCORE	PER CAPITA INCOME	WELFARE PAYMENTS	RESOURCE GAP SCORE	RANK (Best to Worst)
Springfield PHCA	-37.29	8	5	-24.29	1
Kansas City PHCA	-27.31	13	0	-14.31	2
Joplin PHCA	-17.61	7	5	-5.61	3
Lebanon PHCA	-11.61	5	3	-3.76	4
St. Louis PHCA	-18.93	15	2	-1.93	5
Rolla PHCA	-7.72	5	2	-0.72	6
Cape Girardeau PHCA	-9.68	7	2	-0.68	7
St. Charles PHCA	-12.53	10	2	-0.53	8
Cameron PHCA	-10.08	10	3	2.92	9
Jefferson City PHCA	-2.85	9	2	8.15	10
Perryville PHCA	-1.17	8	2	8.83	11
Branson PHCA	2.29	4	4	10.29	12
Louisiana PHCA	1.41	9	1	11.41	13
Poplar Bluff PHCA	6.81	2	5	13.81	14
Columbia PHCA	9.02	8	3	20.02	15
Marshall PHCA	6.26	12	3	21.26	16
Tarkio PHCA	5.56	15	3	23.56	17
St. Joseph PHCA	9.50	11	4	24.50	18
Bolivar PHCA	19.56	3	4	26.56	19
Monett PHCA	18.13	5	4	27.13	20
Clinton PHCA	13.75	12	2	27.75	21
Eldon PHCA	22.82	4	2	28.82	22
Han/Quincy PHCA	19.76	9	1	29.76	23

continued . . .

(12) Taken from Lanis Hicks, Lyn Fox, Gayle Lane, Michael Herrick, Missouri Health Manpower Analyses: Dental Manpower, Jefferson City, Missouri, Missouri Department of Social Services, June, 1976, p. 105.

TABLE 21: RESOURCE GAP SCORES RECEIVED BY EACH PRIMARY HEALTH CARE AREA (continued)

PRIMARY HEALTH CARE AREA	SERVICES GAP SCORE	PER CAPITA INCOME	WELFARE PAYMENTS	RESOURCE GAP SCORE	RANK (Best to Worst)
Sedalia PHCA	21.87	7	2	30.87	24
Unionville PHCA	25.71	9	1	35.71	25
Maryville PHCA	23.96	9	3	35.96	26
Trenton PHCA	24.21	10	2	36.21	27
Chillicothe PHCA	27.62	10	2	39.62	28
Salem PHCA	34.22	2	4	40.22	29
Festus PHCA	32.30	6	2	40.30	30
Wash/Sullivan PHCA	32.48	7	2	41.48	31
Kirksville PHCA	30.55	9	2	41.55	32
Farmington PHCA	34.05	4	4	42.05	33
Ironton PHCA	36.70	4	2	42.07	34
Warrensburg PHCA	34.81	8	1	43.81	35
Harrisonville PHCA	31.89	10	3	44.89	36
Nevada PHCA	35.54	8	3	46.54	37
West Plains PHCA	41.63	1	4	46.63	38
Moberly PHCA	37.78	11	1	49.78	39
Mountain Grove PHCA	43.89	2	4	49.89	40
Waynesville PHCA	36.18	11	3	50.18	41
Sikeston PHCA	42.25	6	5	53.25	42
Mexico PHCA	41.66	11	1	53.66	43
Macon PHCA	43.13	11	1	55.13	44
Kennett PHCA	46.52	6	4	56.52	45
Anderson PHCA	49.95	2	5	56.95	46
Bethany PHCA	44.34	13	3	60.34	47
Car/Hayti PHCA	55.22	6	5	66.22	48
Kahoka PHCA	57.39	10	0	67.39	49
Mt. Home, AR PHCA[1]	75.88	0	5	80.88	50

[1]Since this Primary Health Care Area crosses Missouri State boundaries, it is difficult to truly determine the manpower situation. All analyses have been conducted utilizing Missouri data only.

RESOURCE GAP SCORE AND RANK RECEIVED BY EACH PRIMARY HEALTH CARE AREA

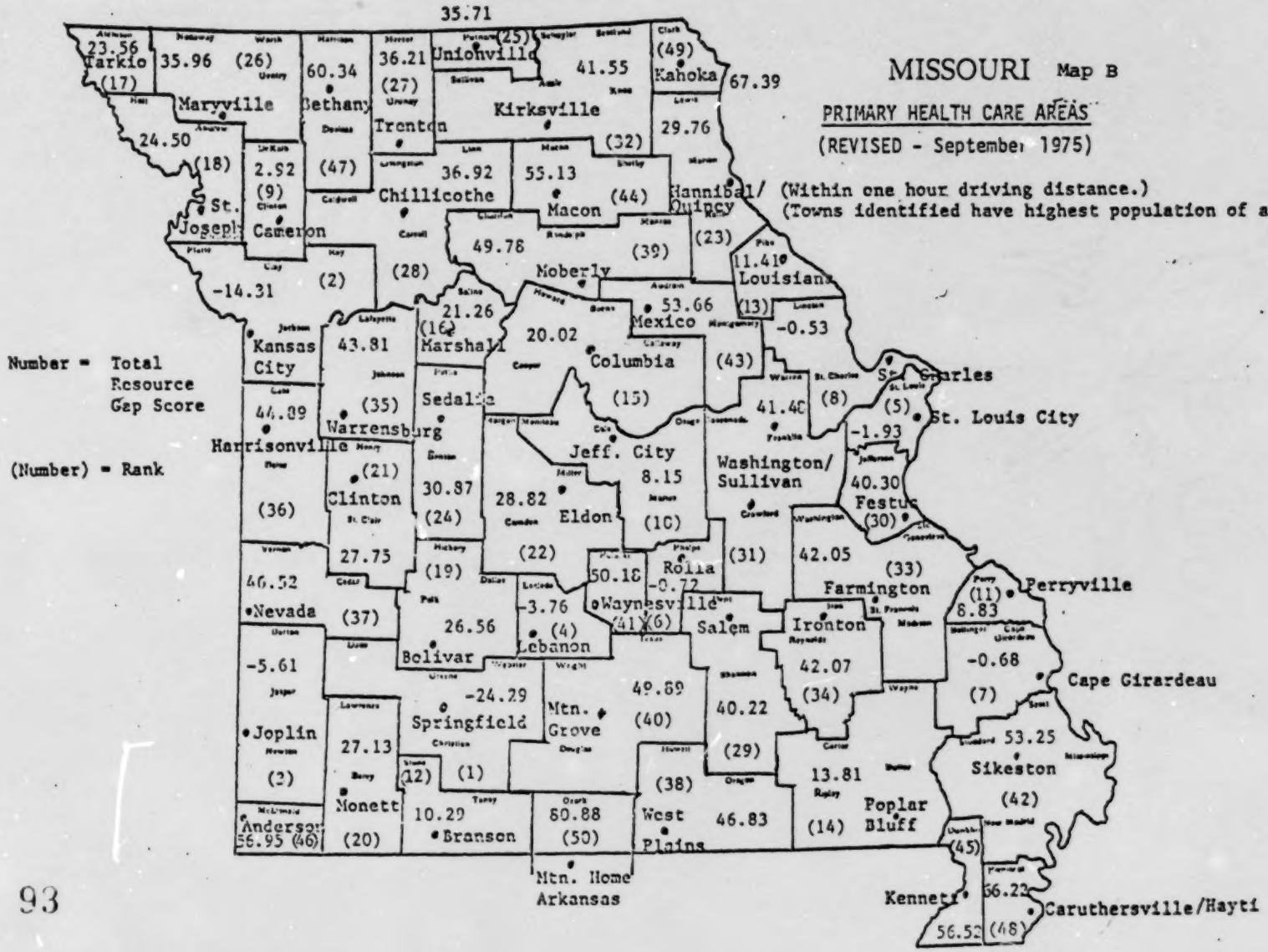

Table 22 shows that Primary Health Care Areas, their Resource Gap Score, rank and theoretically, the number of additional dentists required to bring the area to a level comparable to the national average. In performing the calculations, it was necessary to determine the percentage of a full-time equivalent dentist which would warrant an additional dentist. It was decided that if the calculation for additional dentists yielded a requirement between .5 and .9, an additional dentist was warranted; but if the calculation yielded a requirement of .1 through .4, an additional dentist was not warranted.

The figures in Table 22 are derived from national norms. Few specific geographical areas are identical to the national norm in their utilization of dental services. Some areas, most notably inner-city areas in St. Louis and Kansas City, and rural areas such as in the southeast and Bootheel regions, may utilize far fewer services than the national norms. While the population size and composition of these areas may indicate an ability to support more dentists, all other things being equal, this lower utilization rate at the present time greatly reduces this need for additional dental manpower. The reasons for such under utilization of services are varied and complex. Among the possible factors are lower income levels, lower educational attainment levels, a lack of access due to poor rural roads and a lack of adequate public transportation.

5.3.2 Conclusions

Missouri does not have a problem associated with the number of dentists on a statewide basis. If health manpower planning continues to concentrate on only increasing the total number of dentists in Missouri, the problem will never be solved. The nature of the problem in Missouri is one of distribution. Hence, there are areas of the state which have an adequate or more than adequate supply of dentists, while other areas have a deficiency of dentists. Consequently, methods must be devised which will attract dentists to these deficient areas or will transport the patients in these

TABLE 22: RESOURCE GAP SCORES RECEIVED BY EACH PRIMARY HEALTH CARE AREA; RANK; AND, THEORETICALLY, ADDITIONAL REQUIREMENTS (13)

PRIMARY HEALTH CARE AREA	RESOURCE GAP SCORE	RANK (Best to Worst)	ADDITIONAL THEORETICAL REQUIREMENTS	
			WITH ADDITIONAL FACTORS[2]	WITHOUT ADDITIONAL FACTORS[2]
Springfield PHCA	-24.29	1	-24	-37
Kansas City PHCA	-14.31	2	-60	-116
Joplin PHCA	-5.61	3	-4	-11
Lebanon PHCA	-3.76	4	0	-1
St. Louis PHCA	-1.93	5	-16	-153
Rolla PHCA	-0.72	6	0	-1
Cape Girardeau PHCA	-0.68	7	-1	-3
St. Charles PHCA	-0.53	8	0	-7
Cameron PHCA	2.92	9	0	-1
Jefferson City PHCA	8.15	10	3	-1
Perryville PHCA	8.83	11	1	0
Branson PHCA	10.29	12	1	0
Louisiana PHCA	11.41	13	1	0
Poplar Bluff PHCA	13.81	14	4	2
Columbia PHCA	20.02	15	15	7
Marshall PHCA	21.26	16	3	1
Tarkio PHCA	23.56	17	1	0
St. Joseph PHCA	24.50	18	13	5
Bolivar PHCA	26.56	19	4	3
Monett PHCA	27.13	20	6	4
Clinton PHCA	27.75	21	4	2
Eldon PHCA	28.82	22	6	4
Hannibal/Quincy PHCA	29.76	23	10	5
Sedalia PHCA	30.87	24	7	5
Unionville PHCA	35.71	25	1	4
Maryville PHCA	35.96	26	7	4
Trenton PHCA	36.21	27	3	2
Chillicothe PHCA	39.62	28	10	7
Salem PHCA	40.22	29	4	3
Festus PHCA	40.30	30	22	17
Washington/Sullivan PHCA	41.48	31	19	15
Kirksville PHCA	41.55	32	10	7
Farmington PHCA	42.05	33	28	13
Ironton PHCA	42.07	34	3	3
Warrensburg PHCA	43.81	35	14	11
Harrisonville PHCA	44.89	36	13	9

continued . . .

(13) Taken from Lanis Hicks, Lyn Fox, Gayle Lane, Michael Herrick, Missouri Health Manpower Analyses: Dental Manpower, Jefferson City, Missouri, Missouri Department of Social Services, June 1976, p. 108.

TABLE 22: RESOURCE GAP SCORES RECEIVED BY EACH PRIMARY HEALTH CARE AREA; RANK; AND, THEORETICALLY, ADDITIONAL REQUIREMENTS (continued)

PRIMARY HEALTH CARE AREA	RESOURCE GAP SCORE	RANK (Best to Worst)	ADDITIONAL THEORETICAL REQUIREMENTS	
			WITH ADDITIONAL FACTORS[2]	WITHOUT ADDITIONAL FACTORS[2]
Nevada PHCA	46.54	37	7	5
West Plains PHCA	46.63	38	8	7
Moberly PHCA	49.78	39	11	8
Mountain Grove PHCA	49.89	40	10	9
Waynesville PHCA	50.18	41	6	4
Sikeston PHCA	53.25	42	27	21
Mexico PHCA	53.66	43	10	8
Macon PHCA	55.13	44	6	5
Kennett PHCA	56.52	45	10	8
Anderson PHCA	56.95	46	4	3
Bethany PHCA	60.34	47	5	4
Caruthersville/Hayti PHCA	66.22	48	8	7
Kahoka PHCA	67.39	49	3	2
Mountain Home, AR PHCA[1]	80.88	50	3	2
STATE TOTAL			226	-108

[1]Since this Primary Health Care Area crosses Missouri State boundaries, it is difficult to truly determine the manpower situation. All analyses have been conducted utilizing Missouri data only.

[2]Additional factors include points assigned for welfare payments for dental services and per capita income.

*These "additional theoretical requirements" are based on national utilization and productivity data. Given existing conditions it may be unrealistic to expect the areas to support these additional services. The negative numbers indicate excess numbers of dentist necessary to provide the area with services equal to the national norm.

deficient areas to the dentists in nearby areas.

It must be remembered that the analyses performed in this report were based upon the "needs" of the population according to national productivity and utilization rates, not on the "wants" of the population. In so doing, this ignores the fact that some individuals have "wants" for dental services beyond those acutally "needed." Under the present system of health care delivery, the dental profession provides for these "wants." Therefore, dentists in the areas identified as having a more than adequate amount of services are, in part, meeting these "wants."

5.4 Pharmacy Manpower Data Available for Analyses[14]

The 1975-76 licensure questionnaire distributed by the State Center for Health Statistics, Division of Health, State of Missouri, provided the following information utilized in these analyses:

1) Practice location of licensed pharmacists by county,
2) Activity status of licensed pharmacists,
3) Number of hours worked per week, and
4) Number of weeks worked per year.

No data were available on either a national or state level concerning the productivity of pharmacists nor the degree of impact pharmacy aides have on the productivity of pharmacists. Similarly, no data were available on a state or national level on the utilization of pharmaceutical services by the population. These data gaps seriously limit the methodological options available for determining the adequacy of pharmaceutical manpower in Missouri.

Another serious deficiency in the data was the lack of a measure of the number of pharmacy aides in Missouri. No survey has been conducted which attempted to count these auxiliary personnel.

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(14) Taken from Lanis Hicks, Bruce Moran, Gayle Lane, and Lyn Fox. Missouri Health Manpower Analyses: Pharmacy Manpower, Jefferson City, Missouri. Missouri Department of Social Services, June 1976. p. 79.

Since these aides are not required to be licensed or registered, it is extremely difficult to obtain an accurate count.

The attempted requirement assessment has been hindered further by the lack of data concerning the secondary practice location of active pharmacists. For example, if a pharmacist is employed three days a week in Springfield and two days a week in Branson, he or she has been counted as working full time in Springfield.

5.4.1 Determination of Percent Requirement of Pharmaceutical Services in Missouri

The ratio of active pharmacists per 100,000 population was calculated for each Primary Health Care Area (PCHA). Table 23 shows the ratio received by each Primary Health Care Area, the percent of the area's requirement currently being met, the number of additional pharmacists required to bring the area to the national ratio of 62.5/100,000 population, and the rank of the area (best to worst) based on the percent of requirement currently being met. (See Map C for geographic location of these Primary Health Care Areas.)

Table 24 is a ranking of the Primary Health Care Areas in Missouri according to how well the requirement for pharmacy manpower is currently being met. Based on the ratio methodology, six areas have an adequate or more than adequate supply of pharmacists to bring them to the national ratio, while 44 areas have a need for additional pharmacists. In instances where more than one area has the same percentage of manpower requirement met, the area requiring fewest additional pharmacists was listed first.

In determining the number of additional active pharmacists required to bring an area to a level equal to the national average, it was necessary to determine what percentage of an active pharmacist would warrant an additional pharmacist. It was decided, if the calculations for additional active pharmacists yielded a requirement between .5 and .9, then an additional pharmacist was warranted; but, if the calculations yielded a requirement of .1 through .4, an additional pharmacist was not warranted.

TABLE 23: RATIO OF ACTIVE PHARMACISTS PER 100,000 POPULATION AND RANK, 1976 (15)

PRIMARY HEALTH CARE AREA	ACTIVE PHARMACISTS/ PER 100,000 POPULATION	PERCENT OF REQUIREMENT MET	ADDITIONAL PHARMACISTS REQUIRED	RANK (Best to Worst)
Marshall PHCA	85.0	136.0%	-6	1
Cape Girardeau PHCA	76.7	122.7%	-9	2
Kansas City PHCA	73.2	117.1%	-90	3
St. Louis PHCA	69.2	110.7%	-102	4
West Plains PHCA	63.9	102.2%	0	5
Caruthersville/ Hayti PHCA	60.7	97.1%	0	6
St. Joseph PHCA	56.4	90.2%	6	7
Kennett PHCA	56.0	89.6%	2	8
Branson PHCA	55.7	89.1%	2	9

continued . . .

(15) Taken from Lanis Hicks, Bruce Moran, Gayle Lane, and Lyn Fox, Missouri Health Manpower Analyses: Pharmacy Manpower, Jefferson City, Missouri. Missouri Department of Social Services, June, 1976. p. 81-82.

TABLE 23: RATIO OF ACTIVE PHARMACISTS PER 100,000 POPULATION AND RANK, 1976 (continued)

PRIMARY HEALTH CARE AREA	ACTIVE PHARMACISTS/ PER 100,000 POPULATION	PERCENT OF REQUIREMENT MET	ADDITIONAL PHARMACISTS REQUIRED	RANK (Best to Worst)
Tarkio PHCA	55.5	88.8%	1	10
Trenton PHCA	54.2	86.7%	1	11
Poplar Bluff PHCA	54.0	86.4%	5	12
Clinton PHCA	53.6	85.8%	3	13
Maryville PHCA	53.4	85.4%	3	14
Joplin PHCA	53.1	85.0%	12	15
Columbia PHCA	51.8	82.9%	15	16
Sikeston PHCA	51.1	81.8%	12	17
Springfield PHCA	49.9	79.8%	27	18
Louisiana PHCA	48.2	77.1%	2	19
Warrensburg PHCA	47.8	76.5%	10	20
Farmington PHCA	47.1	75.4%	12	21
Mexico PHCA	45.7	73.1%	6	22
Cameron PHCA	45.2	72.3%	4	23
Moberly PHCA	44.7	71.5%	8	24
Hannibal/Quincy PHCA	44.4	71.0%	9	25
Chillicothe PHCA	43.1	69.0%	10	26
Nevada PHCA	43.0	68.8%	6	27
Rolla PHCA	41.0	65.6%	7	28
Sedalia PHCA	38.2	61.1%	11	29
Monett PHCA	38.2	61.1%	12	29
St. Charles PHCA	38.2	61.1%	32	29
Bethany PHCA	37.8	60.5%	5	32
Macon PHCA	37.7	60.3%	6	33
Harrisonville PHCA	37.6	60.2%	16	34
Washington/ Sullivan PHCA	36.9	59.0%	27	35
Waynesville PHCA	36.7	58.7%	3	36
Jefferson City PHCA	35.3	56.5%	22	37
Lebanon PHCA	35.2	56.3%	6	38
Ironton PHCA	35.1	56.2%	5	39
Anderson PHCA	34.2	54.7%	4	40
Unionville PHCA	33.9	54.2%	28	41
Perryville PHCA	32.7	52.3%	5	42
Festus PHCA	30.8	49.3%	39	43
Kirksville PHCA	29.5	47.2%	16	44
Mtn. Grove PHCA	27.7	44.3%	16	45
Bolivar PHCA	26.0	41.6%	13	46
Kahoka PHCA	24.7	39.5%	3	47
Eldon PHCA	21.9	35.0%	19	48
Salem PHCA	19.1	30.6%	9	49
Mtn. Home, AR PHCA[1]	14.1	22.6%	3	50
STATE TOTAL	57.7	92.3%	230	

[1]Since this Primary Health Care Area crosses Missouri State boundaries, it is difficult to truly determine the manpower situation. All analyses have been conducted utilizing Missouri data only.

PERCENT OF PHARMACEUTICAL REQUIREMENTS MET, ADDITIONAL PHARMACISTS REQUIRED, AND RANK

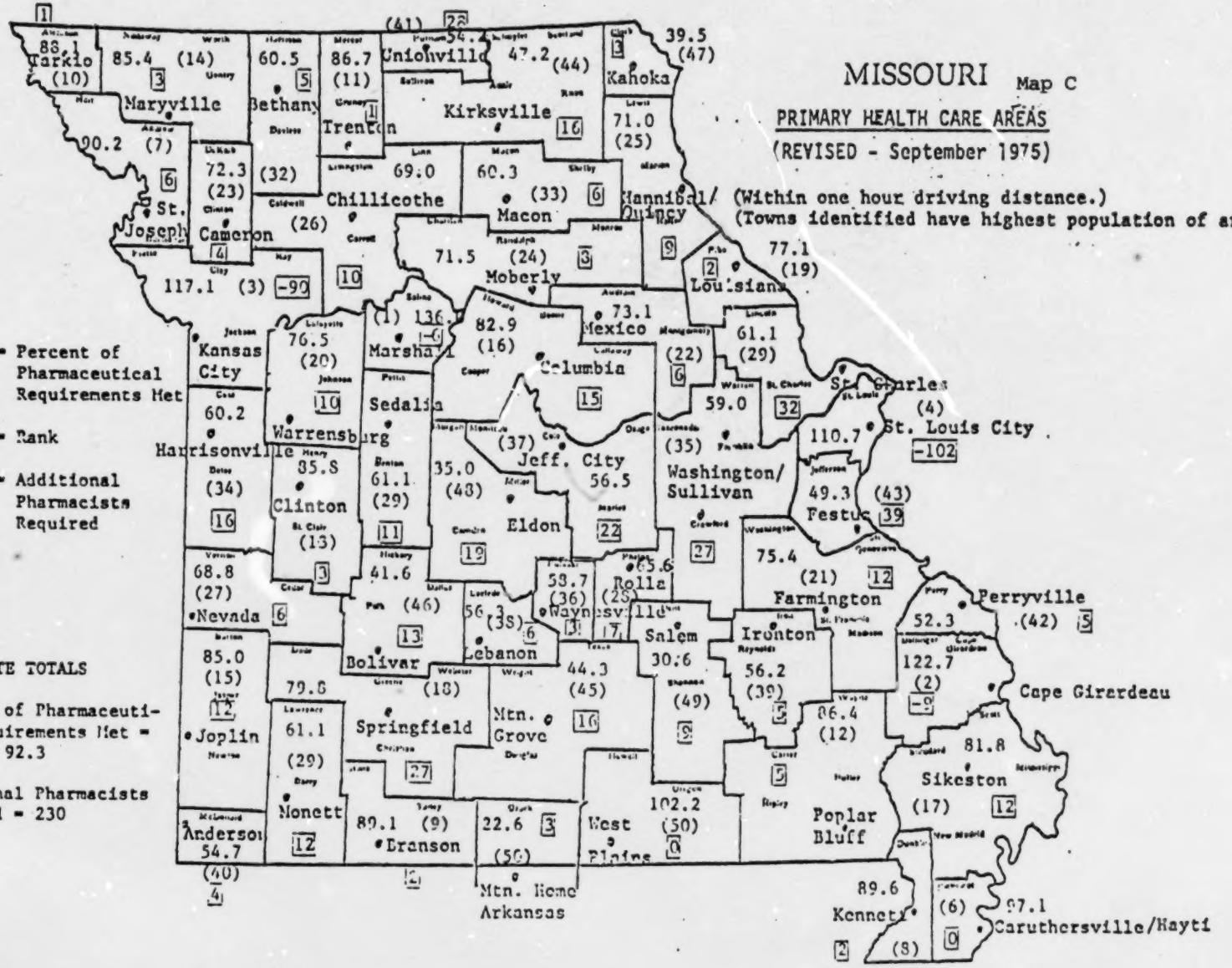

TABLE 24: NUMBER OF FULL-TIME EQUIVALENT PHARMACISTS, PERCENT OF FULL-TIME EQUIVALENT REQUIREMENTS MET IN PRIMARY HEALTH CARE AREAS AND RELATIVE RANKINGS (16)

PRIMARY HEALTH CARE AREA	FULL-TIME EQUIVALENT PHARMACISTS	PERCENT REQUIREMENT MET	RANK (Best to Worst)
Marshall PHCA	20.75	134.4%	1
Cape Girardeau PHCA	46.75	119.5%	2
Kansas City PHCA	566.25	107.8%	3
St. Louis PHCA	984.00	103.8%	4
West Plains PHCA	21.50	95.5%	5
Branson PHCA	17.00	89.1%	6
Tarkio PHCA	5.00	88.8%	7
St. Joseph PHCA	57.75	86.9%	8
Kennett PHCA	19.25	86.2%	9
Poplar Bluff PHCA	31.50	82.6%	10
Maryville PHCA	12.25	81.9%	11
Joplin PHCA	66.75	81.0%	12
Trenton PHCA	8.25	79.5%	13
Louisiana PHCA	8.00	77.1%	14
Clinton PHCA	13.50	77.1%	14
Columbia PHCA	67.50	76.6%	16
Sikeston PHCA	49.50	76.3%	17
Springfiled PHCA	101.75	75.2%	18
Caruthersville/Hayti PHCA	11.50	74.6%	19
Mexico PHCA	17.00	73.1%	20
Farmington PHCA	33.25	67.8%	21
Warrensburg PHCA	26.75	65.9%	22
Hannibal/Quincy PHCA	19.50	65.9%	22
Chillicothe PHCA	20.50	64.2%	24
Moberly PHCA	16.50	62.1%	25
Rolla PHCA	12.25	61.8%	26
Nevada PHCA	11.25	59.7%	27
Harrisonville PHCA	24.00	59.5%	28
St. Charles PHCA	48.50	58.1%	29
Sedalia PHCA	17.00	57.8%	30
Ironton PHCA	6.00	56.2%	31
Waynesville PHCA	3.75	55.0%	32
Anderson PHCA	5.00	54.7%	33
Jefferson City PHCA	27.00	54.4%	34
Unionville PHCA	2.00	54.2%	35
Bethany PHCA	6.25	54.1%	36
Macon PHCA	8.00	53.6%	37
Washington/Sullivan PHCA	35.25	53.3%	38
Cameron PHCA	7.65	52.5%	39
Perryville PHCA	5.00	52.3%	40
Monett PHCA	15.50	49.9%	41
Kirksville PHCA	13.25	44.8%	42
Mtn. Grove PHCA	12.75	43.4%	43

continued . . .

(16) Taken from Lanis Hicks, Burce Moran, Gayle Lane, and Lyn Fox, Missouri Health Manpower Analyses: Pharmacy Manpower, Jefferson City, Missouri. Missouri Department of Social Services, June, 1976. p. 87-88.

TABLE 24 NUMBER OF FULL-TIME EQUIVALENT PHARMACISTS, PERCENT OF FULL-TIME EQUIVALENT REQUIREMENT MET IN PRIMARY HEALTH CARE AREAS AND RELATIVE RANKINGS (continued)

PRIMARY HEALTH CARE AREA	FULL-TIME EQUIVALENT PHARMACISTS	PERCENT REQUIREMENT MET	RANK (Best to Worst)
Lebanon PHCA	6.00	42.2%	44
Festus PHCA	32.00	41.6%	45
Bolivar PHCA	7.25	33.6%	46
Kahoka PHCA	1.50	29.6%	47
Eldon PHCA	8.25	29.0%	48
Salem PHCA	3.00	23.0%	49
Mtn. Home, AR PHCA[1]	1.00	22.6%	50

[1]Since this Primary Health Care Area crosses Missouri State boundaries, it is difficult to truly determine the manpower situation. All analyses have been conducted utilizing Missouri data only.

It should be emphasized that the ranking system was based on percent of pharmacy manpower requirement met, and not on the absolute number of pharmacists required. An area requireing a small number of additional pharmacists would improve its ranking much more by the addition of one or two pharmacists than would an area with a large number of additional pharmacists required.

The number of additional pharmacists required for an area was determined under the assumption that no substitution for pharmacist's services would be made by other health professionals. It is possible, for example, that physicians, podiatrists, or dentists may dispense medications in their own offices. This provides an alternative means of meeting the need for pharmacy services without pharmacists.

Table 25 shows a ranking of the Primary Health Care Areas in Missouri according to how well the requirements for pharmacy manpower are being met when pharmacists are being analyzed on an active, full time equivalent basis. Based on the ratio methodology, only four Primary Health Care Areas have an adequate or more than adequate supply of pharmacists, while 46 areas have need for additional pharmacists to bring them to the 1973 national ratio of 62.5 active pharmacists per 100,000 population.

In defining active, full time equivalent pharmacists, the following breakdown of hours worked per year at pharmaceutical activities was used:

≥ 1680 = full time	721 - 1199 = half-time
1200 - 1679 = three-quarter time	300 - 720 = quarter-time
	< 300 = zero

It should be emphasized that the ranking system was based on percent of pharmacy manpower requirement met, and not on the absolute number of additional pharmacists required. Therefore, an area requiring only a small number of pharmacists is affected to a greater degree by the presence or absence of one pharmacist than is an area which requires a large number of pharmacists.

TABLE 25: FINAL RELATIVE RANKING (BEST TO WORST) OF REQUIREMENT FOR PHARMACEUTICAL SERVICES [17]

PRIMARY HEALTH CARE AREA	ACTIVE PHARMACISTS RANK	65 AND OVER RANK	FULL-TIME EQUIVALENT RANK	FINAL COMPOSITE RANK
Marshall PHCA	1	1	1	1
Cape Girardeau PHCA	2	2	2	2
Kansas City PHCA	3	5	3	3
St. Louis PHCA	4	3	4	3
Branson PHCA	10	7	6	5
West Plains PHCA	5	14	5	6
St. Joseph PHCA	7	10	8	7
Trenton PHCA	11	4	13	8
Kennett PHCA	8	13	9	9
Caruthersville/Hayti PHCA	6	6	19	10
Clinton PHCA	13	8	14	11
Joplin PHCA	15	11	12	12
Maryville PHCA	14	15	11	13
Louisiana PHCA	19	12	14	14
Poplar Bluff PHCA	12	26	10	15
Tarkio PHCA	9	33	7	16
Springfield PHCA	18	20	18	17
Columbia PHCA	16	25	16	18
Farmington PHCA	21	16	21	19
Mexico PHCA	22	17	20	20
Warrensburg PHCA	20	22	22	21
Hannibal/Quincy PHCA	25	18	22	22
Sikeston PHCA	17	34	17	23
Moberly PHCA	24	19	25	23
Cameron PHCA	23	9	39	25
Chillicothe PHCA	26	21	24	25
Nevada PHCA	27	24	27	27
Rolla PHCA	28	27	26	28
Sedalia PHCA	29	30	30	29
Waynesville PHCA	36	23	32	30
St. Charles PHCA	29	39	29	31
Monett PHCA	29	29	41	32

continued . . .

(17) Taken from Lanis Hicks, Bruce Moran, Gayle Lane, and Lyn Fox, Missouri Health Manpower Analyses: Pharmacy Manpower, Jefferson City, Missouri. Missouri Department of Social Services., June 1976. p. 89-90.

TABLE 25: FINAL RELATIVE RANKING (BEST TO WORST)
OF REQUIREMENT FOR PHARMACEUTICAL SERVICES (continued)

PRIMARY HEALTH CARE AREA	ACTIVE PHARMACISTS RANK	65 AND OVER RANK	FULL-TIME EQUIVALENT RANK	FINAL COMPOSITE RANK
Anderson PHCA	40	28	33	33
Macon PHCA	33	32	27	34
Bethany PHCA	32	35	36	35
Harrisonville PHCA	34	43	28	36
Unionville PHCA	41	31	35	37
Jefferson City PHCA	37	37	34	38
Ironton PHCA	39	38	31	38
Washington/Sullivan PHCA	35	36	38	40
Lebanon PHCA	38	40	44	41
Perryville PHCA	42	41	40	42
Mtn. Grove PHCA	45	42	43	43
Festus PHCA	43	44	45	44
Kirksville PHCA	44	46	42	44
Bolivar PHCA	46	47	46	46
Eldon PHCA	48	45	48	47
Kahoka PHCA	47	49	47	48
Salem PHCA	49	50	49	49
Mtn. Home, AR PHCA[1]	50	48	50	49

[1]Since this Primary Health Care Area crosses Missouri State boundaries, it is difficult to truly determine the manpower situation. All analyses have been conducted utilizing Missouri data only.

Again, it must be stressed that no consideration is given to the other health practitioners in the area (i.e., dentists, podiatrists, or physicians) who may be dispensing drugs. Also, no information is available on the amount of pharmaceutical services being provided by mailorder dispensaries.

After completing the three separate analyses, it was necessary to devise a method of combining these analyses in order to obtain a final ranking identifying the Primary Health Care Areas having the greatest requirement for additional pharmaceutical services. In order to obtain this final ranking, the ranks received by each of the earlier assessments were compared with equal weight bring assigned to each assessment. That is, the three scores were added together with this total being ranked from feqest points to highest points. This comparison provided the final ranking shown in Table 25.

5.4.2 Conclusions

The analyses of the pharmaceutical manpower situation in Missouri indicate that, as a whole, Missouri does not currently have a critical shortage of pharmaceutical services as 92.3 percent of its requirements for pharmacists are being met. To provide Missouri with a ratio of 62.5 active pharmacists per 100,000 population the state would require 3011. Missouri has 2759. However, there are areas of Missouri which do appear to have a more severe shortage problem indicating that not only does Missouri have somewhat of a problem associated with numbers of pharmacists, it also has a problem associated with the distribution of these pharmacists.

5.5 Nursing Manpower Data Available for Analyses

It is difficult to assess the magnitude of the geographic maldistribution problem because of the quality of available data as to supply and the validity of criteria used for determining requirements. Mi-souri Health Manpower Planning Office projections of statewide requirements are based on criteria established in 1967 and considered only direct care fields of employment (general hospital,

psyciatric hospital, nursing home, community health, school health and offices). There are no requirements projected for education and research needs, administrative needs (other than general hospital) and primary care practitioners. A summary of the projected requirements is presented in Table 26. The percent of met needs are presented in Table 27. The number of nurses indicating baccalaureate and masters degrees is somewhat confounded by the fact that a large number of the degrees are not in fact degrees in nursing. Neither Table 26 nor 27 reflect non-direct care needs.

The experience of the employers of nurses indicated the inadequacy of the data. Though data indicated over 100% need met for RNs in the Kansas City area, in February, 1979 there were over 300 budgeted vacancies in the hospitals in the Kansas City Metroarea. Shortages exist within the nursing education sector as well with many positions filled by nurses with lesser qualifications.

Table 27 is a summary of the percent of the requirements of each educational preparation category of nurses being met in each Primary Health Care Area. The Primary Health Care Areas are ranked in each educational category. A column is dedicated to the Percent of Met Need for total registered nurses. The Primary Health Care Areas are also ranked in this column. Like the previous tables showing the statewide distribution of registered nurses, there are currently 1,443 additional active registered nurses which do not appear in Table 27. This is due to the lack of information concerning employment setting, location of employment, and educational preparation for these 1,443 registered nurses. Therefore, while the state of Missouri is presently meeting 103.59 percent of its requirements for registered nurses there are only seven Primary Health Care Areas which are meeting 100 percent or more of their respective requirements for total registered nurses. Yet even without these 1,443 registered nurses distributed throughout the state, the majority (68%) of the Primary Health Care Areas are meeting over fifty percent of their respective total registered nurses requirements. In fact, 48 percent (24) are meeting at least seventy

TABLE 26: STATEWIDE REQUIREMENTS AND AVAILABILITY OF NURSES

EMPLOYMENT SETTING / EDUCATIONAL PREPARATION	NURSES REQUIRED	ACTIVE NURSES 1975	PERCENT OF MET NEED	ADDITIONAL NURSES NEEDED TO MEET 100% OF REQUIREMENT
Hospitals				
Masters(plus)-R.N.	1,151.85	177	15.37%	974.85
Baccalaureate-R.N.	2,204.03	1,496	67.88%	708.03
Diploma/Associate-R.N.	6,761.80	7,990	118.16%	-1,228.20
Total R.N.s	10,117.68	9,663	95.51%	454.68
L.P.N.s	4,630.89	4,240	91.56	390.89
Nursing Homes				
Masters(plus)-R.N.		9	900.00%	-9.00
Baccalaureate-R.N.	144.00	66	45.83%	78.00
Diploma/Associate-R.N.	726.70	684	94.12%	42.70
Total R.N.s	870.70	759	87.17%	111.70
L.P.N.s	959.37	1,063	110.80	-103.63
Other Employment				
Masters(plus)-R.N.	717.10	275	38.35%	442.10
Baccalaureate-R.N.	918.16	691	75.26%	227.16
Diploma/Associate-R.N.	2,454.11	2,788	113.61%	-333.89
Total R.N.s	4,089.37	3,754	91.80%	335.37
L.P.N.s	1,343.17	1,480	110.19	-136.83
Totals				
Masters(plus)-R.N.	1,868.95	461	24.67%	1,407.95
Baccalaureate-R.N.	3,266.19	2,253	68.98%	1,013.19
Diploma/Associate-R.N.	9,942.61	11,462	115.28%	-1,519.39
Total R.N.s	15,077.75	14,176*	94.02%	901.75*
		(15,619)**	(103.59)**	(-541.25)**
L.P.N.	6,933.43	6,783	97.83	150.43

*Total of all active registered nurses who indicated educational preparation and employment setting.

**Total of all active registered nurses, including those who did not indicate educational preparation and/or employment setting.

[1]Negative number represents number of full-time equivalent nurses in excess of the required number.

TABLE 27: PRIMARY HEALTH CARE AREAS: SUMMARY OF PERCENT OF MET NEED FOR NURSES BY EDUCATIONAL PREPARATION

PRIMARY HEALTH CARE AREA	EDUCATIONAL PREPARATION									
	MASTERS (PLUS)-R.N.		BACCALAUREATE-R.N.		DIPLOMA/ ASSOCIATE-R.N.		TOTAL R.N.'S		L.P.N.	
	% OF MET NEED	RANK (Best to Worst)	% OF MET NEED	RANK (Best to Worst)	% OF MET NEED	RANK (Best to Worst)	% OF MET NEED	RANK (Best to Worst)	% OF MET NEED	RANK (Best to Worst)
Tarkio PHCA	0	25	47.51	22	88.30	26	62.97	28	66.05	47
Maryville PHCA	29.74	7	19.72	40	99.79	22	67.15	25	131.51	19
St. Joseph PHCA	39.42	2	35.92	28	125.18	9	99.55	8	93.35	36
Cameron PHCA	0	25	27.32	36	104.05	20	74.30	22	85.26	39
Bethany PHCA	0	25	33.17	31	78.56	28	57.35	31	93.73	35
Trenton PHCA	8.64	17	14.31	44	80.85	27	50.05	34	179.09	6
Unionville PHCA	0	25	98.68	6	14.73	50	25.63	49	101.69	31
Kirksville PHCA	6.19	19	51.07	18	42.73	46	36.94	45	104.32	29
Keokuk, IA PHCA	0	25	0	48	149.57	3	89.74	13	92.81	38
Hannibal/Quincy PHCA	0	25	36.05	27	97.25	23	72.66	23	153.55	10
Macon PHCA	0	25	116.73	3	7 41	34	70.00	24	156.25	9
Moberly PHCA	0	25	44.47	24	37.62	49	33.98	47	98.75	33
Chillicothe PHCA	0	25	49.44	20	55.44	42	48.26	38	122.26	22
Kansas City PHCA	35.05	3	114.82	4	154.54	2	133.11	2	110.20	28
Mexico PHCA	7.96	18	68.00	8	72.10	35	64.99	26	148.11	12
Louisiana PHCA	0	25	120.24	2	116.44	14	102.42	4	126.30	21
St. Charles PHCA	13.27	13	60.00	12	187.02	1	134.84	1	49.25	50
Columbia PHCA	33.92	4	143.50	1	89.87	25	90.23	12	84.92	42
Jefferson City PHCA	16.24	10	74.80	7	100.08	21	84.87	18	134.89	16
Marshall PHCA	15.08	11	40.98	26	137.41	5	100.94	6	203.85	2
Sedalia PHCA	12.36	15	53.92	14	107.62	16	88.43	15	133.22	17
Warrensburg PHCA	51.40	1	51.52	17	105.67	18	88.20	16	99.45	32
Harrisonville PHCA	0	25	52.61	16	74.93	32	60.82	29	117.12	25
Clinton PHCA	0	25	22.38	38	76.50	30	59.57	30	139.83	14
Eldon PHCA	0	25	15.69	43	148.65	4	87.61	17	118.90	24
Rolla PHCA	13.22	14	66.46	9	121.99	10	100.11	7	113.73	26
Washington/Sullivan PHCA	4.61	22	48.10	21	121.10	11	89.10	14	112.92	27

continued . . .

TABLE 27: PRIMARY HEALTH CARE AREAS: SUMMARY OF PERCENT OF MET NEED FOR NURSES BY EDUCATIONAL PREPARATION (continued)

PRIMARY HEALTH CARE AREA	EDUCATIONAL PREPARATION									
	MASTERS(PLUS)-R.N.		BACCALAUREATE-R.N.		DIPLOMA/ ASSOCIATE-R.N.		TOTAL R.N.'S		L.P.N.	
	% OF MET NEED	RANK (Best to Worst)	% OF MET NEED	RANK (Best to Worst)	% OF MET NEED	RANK (Best to Worst)	% OF MET NEED	RANK (Best to Worst)	% OF MET NEED	RANK (Best to Worst)
St. Louis PHCA	31.17	5	64.35	11	120.00	12	96.05	11	76.84	43
Festus PHCA	0	25	18.79	41	91.22	24	64.32	27	72.31	45
Farmington PHCA	11.01	16	29.61	35	107.54	17	79.20	20	132.05	18
Perryville PHCA	0	25	53.40	15	131.34	7	96.21	10	71.31	46
Cape Girardeau PHCA	15.01	12	59.82	13	135.11	6	100.98	5	57.24	48
Sikeston PHCA	4.51	23	29.88	34	57.82	43	45.26	40	153.54	11
Kennett PHCA	0	25	26.85	37	47.61	45	38.09	44	194.20	4
Poplar Bluff PHCA	5.82	20	17.37	42	41.54	48	32.99	48	136.74	15
Ironton PHCA	0	25	20.79	39	77.26	29	49.56	35	145.06	13
West Plains	0	25	34.34	30	76.40	31	56.72	32	85.15	40
Salem PHCA	0	25	50.93	19	66.57	37	53.06	33	162.49	8
Lebanon PHCA	0	25	31.44	33	64.08	39	49.28	36	75.60	44
Bolivar PHCA	0	25	44.11	25	59.88	40	44.47	41	93.13	37
Branson PHCA	0	25	8.70	47	73.95	33	48.68	37	96.03	34
Monett PHCA	5.69	21	46.28	23	41.71	47	39.35	43	127.19	20
Nevada PHCA	21.18	8	11.40	45	113.19	15	79.26	19	186.89	5
Caruthersville/Hayti PHCA	0	25	32.59	32	48.91	44	41.19	42	120.21	23
Waynesville PHCA	29.76	6	110.09	5	126.24	8	111.43	3	243.49	1
Mountain Grove PHCA	0	25	8.09	46	70.00	36	46.99	43	104.03	30
Mountain Home, AR PHCA	0	25	0	48	58.82	41	21.32	50	198.02	3
Springfield PHCA	19.90	9	64.97	10	117.85	13	96.77	9	85.11	41
Anderson PHCA	0	25	0	48	64.79	38	34.64	46	56.18	49
Joplin PHCA	2.43	24	35.81	29	105.28	19	78.37	21	170.02	7
STATE OF MISSOURI	24.67		68.98		115.28		94.02* (103.59)**		97.83	

*Percent of met need considering active Registered Nurses who indicated educational preparation and employment setting.

**Percent of met need considering all active Registered Nurses, including those who did not indicate educational preparation and/or employment setting.

percent of their respective requirements. According to Table 27, Mountain Home, AR PHCA and Unionville PHCA have the greatest need for additional registered nurses since they are ranked fiftieth and forty-ninth respectively. The other Primary Health Care Areas have needs for additional registered nurses in the order in which they are ranked with the exception of the primary Health Care Areas ranked one through seven, since they are presently meeting at least 100 percent of their prspective requirement for total registered nurses.

The lack of masters(plus) RNs throughout the state becomes even more clear when Table 27 is examined. The state of Missouri is only meeting 24.67 percent of its requirement in this category (without considering the proportion of the 1,443 registered nurses who are master (plus) RNs). There is only one Primary Health Care Area which is meeting over 50 percent of its requirement (Warrensburg PHCA, 51.40%) while there are 26 (52%) Primary Health Care Areas which have no registered nurses holding masters degrees or above. Therefore, all 50 Primary Health Care Areas have need for additional masters RNs.

When baccalaureate RNs are studies in Table 27, it is obvious that the situation is somewhat better than with masters RNs. The state of Missouri is meeting 68.98 percent of tis requirement for these registered nurses (without considering the proportion of the 1,443 registered nurses who are baccalaureate RNs.) There are five Primary Health Care Areas which are currently meeting at least 100 percent of their respective needs for this educational category and 22 (44%) which are meeting at least 50 percent of their requirements. According to Table 27, there are 49 Primary Health Care Areas which do have need for additional baccalaureate RNs with the Primary Health Care Areas of Kahoka; Mountain Home, AR; and Anderson having the greatest need as they do not have any baccalaureate RNs. The other 42 Primary Health Care Areas have requirements in the order in which they are ranked in Table 27.

The situation is much different when diploma/associate

RNs are considered. The state of Missouri is currently meeting 115.28 percent of its requirement for this educational category (without considering the proportion of the 1,443 registered nurses who are diploma/associate RNs). Forty-two percent (21) of the Primary Health Care Areas are currently meeting at least 100 percent of their respective requirements for diploma/associate RNs. The majority, 86 percent, of the Primary Health Care Areas have at least 50 percent of their required diploma/associate RNs. Unionville PHCA and Moberly PHCA have the greatest need for additional diploma/associate RNs as they are ranked fiftieth and forth-ninth respectively. The other Primary Health Care Areas have requirements for additional diploma/associate RNs in the order in which they are ranked in the table with the exceptions of the Primary Health Care Areas ranked one through twenty-one since they are presently meeting at least 100 percent of their respective requirements for diploma/associate RNs.

According to the criteria for registered nurses ser forth by the Health Manpower Planning Task Force Nursing Manpower Team, it can be concluded that there currently is an adequate supply of registered nurses on a statewide basis in Missouri; but, there are many intricate distribution problems prevalent in the state. For example, even on a statewide basis, there are distribution problems in the educational preparation of registered nurses. The state is currently meeting 115.28 percent of its requirements for diploma/associate RN's, but only 24.67 percent of its requirements for masters(plus) RN's. Another statewide distribution problem concerns employment setting. While there appears to be an adequate level of diploma/associate RN's in each employment setting examined, there is not an adequate number of total registered nurses in any employment setting. If the Primary Health Care Areas are examined, these distribution problems, as well as additional ones, can be found. Therefore, even though the state of Missouri does appear to have an adequate number of registered nurses, this does not mean that additional registered nurses could not find

employment in the state or even that the production of registered nurses should be decreased.

The majority of the Primary Health Care Areas, 31 (62%), are meeting at least 100 percent of their current requirement for total licensed practical nurses. The state of Missouri is meeting 97.83 percent of its overall need for licensed practical nurses. There are, however, 19 Primary Health Care Areas which do have requirements for additional licensed practical nurses with the Primary Health Care Areas of St. Charles and Anderson having the greatest requirement since they are ranked fiftieth and forty-ninth respectively. The other 17 Primary Health Care Areas also have requirements.

According to the criteria for licensed practical nurses set forth by the Health Manpower Planning Task Force Nursing Manpower Team, it can be concluded that the state of Missouri is presently achieving almost one hundred percent (97.83%) of its requirements for licensed practical nurses; but, as with registered nurses, there are many apparent distribution problems.

5.5.1 Requirements and Availability for Nurses in Primary Health Care Areas by Employment Setting

Hospitals

In 46 Primary Health Care Areas in which hospitals are located, 31 presently meet zero percent of the requirement for masters(plus) RN. Of the 15 which are currently meeting some of the requirement in this educational category, the Nevada Primary Health Care Area has the highest percentage of met need (37.73%), and the Kirksville Primary Health Care Area the smallest percentage (3.74%). These 15 Primary Health Care Areas are located primarily the the central (Kansas City to St. Louis), southwestern, and northwestern parts of the state.

When baccalaureate RN's are examined, a larger number of Primary Health Care Areas are currently meeting some percent of their respective requirements. Of the 46 Primary Health Care Areas with hospitals, only 3 are meeting zero percent of the require-

ment for baccalaureate RN's. In fact, there are 4 Primary Health Care Areas which are meeting over 100 percent of their requirement for nurses in this category. These are the Louisiana Primary Health Care Area (170.94%), Bolivar Primary Health Care Area (135.13%), Kansas City Primary Health Care Area (119.20%), and Columbia Primary Health Care Area (115.69%).

The range of percent of need being met in the remaining 39 Primary Health Care Areas is from 10.70 percent in the Nevada Primary Health Care Area to 96.15 percent in the Harrisonville Primary Health Care Area. Geographically, the Primary Health Care Areas in the central part of the state (from Kansas City to St. Louis) appear to be meeting the highest percentage of their respective requirements for baccalaureate RN's.

The final category of registered nurses to be discussed is diploma/associate RNs. All 46 Primary Health Care Areas with hospitals are meeting a percentage of their respective needs in this category. Eighteen of the Primary Health Care Areas are cu currently meeting over 100 percent of their requirements. In fact, the great majority of the Primary Health Care Areas are meeting at least 50 percent of their requirement for diploma/associate RNs. The range of percent of met need in this category is from 21.65 percent in Unionville Primary Health Care Area to 203.15 percent in St. Charles Primary Health Care Area.

Of the 46 Primary Health Care Areas which have hospitals, all are at least meeting a certain percentage of their requirements for licensed practical nurses. In fact, 33 (71.7%) of the Primary Health Care Areas are meeting at least 100 percent of their respective requirements for licensed practical nurses in this employment setting. Of the 13 Primary Health Care Areas which do not meet at least 100 percent of their requirements, only one (St. Charles - 27.43%) is under 58 percent of the requirement. It is interesting to note that of these 13 Primary Health Care Areas, 6 have relatively large trade centers: St. Louis, St. Charles, St. Joseph, Columbia, Cape Girardeau, and Springfield. In the

majority of cases where the Primary Health Care Area does not meet 100 percent of its requirements for licensed practical nurses, it does meet over 100 percent of its requirements for diploma/associate RNs. The reverse also appears to be true.

Nursing Homes

The first category of registered nurses to be examined in nursing homes is baccalaureate RNs. Of the 40 Primary Health Care Areas which have requirements for baccalaureate RNs. 28 are presently meeting zero percent of the requirements hile 4 have 100 percent or more of their current need. The other 8 Primary Health Care Areas are meeting between 33.33 percent (Harrisonville and Columbia Primary Health Care Areas) and 70.45 percent (St. Louis Primary Health Care Area). Like the baccalaureate RNs in hospitals, the Primary Health Areas in the central part of the state (from Kansas City to St. Louis) appear to be meeting the highest percentage of their respective requirements in this category.

Diploma/associate RNs appear to be more plentiful in nursing homes across the state than baccalaureate RNs. Of the 49 Primary Health Care Areas which have requirements for diploma/associate RNs, all but 2 (Unionville and Lebanon Primary Health Care Areas) are meeting a certain percentage of these requirements. In fact, 11 are currently meeting 100 percent or more of their requirements. The range of percentage of met need in the other 36 Primary Health Care Areas is between 4.44 percent in Ironton Primary Health Care Area to 99.10 percent in Washington/Sullivan Primary Health Care Area. It should be pointed out that of these 36 Primary Health Care Areas, 25 are at least meeting 50 percent of their requirements. It would appear that the Primary Health Care Areas which are meeting the highest percent of their requirements for diploma/associate RNs are located in the northwest and central (between Kansas City and St. Louis) parts of the state.

All Primary Health Care Areas (49) which have requirements for licensed practical nurses in nursing homes are at least meeting a percentage of their respective requirements. Twenty-eight (57.1%)

are meeting at least 100 percent of this need. The same situation that was found in hospitals appears to exist in nursing homes. The majority of Primary Health Care Areas which have at least 100 percent of their required licensed practical nurses appear to have under 100 percent of their required diploma/associate RNs and vice versa. The Primary Health Care Areas which meet the highest percent of their need for licensed practical nurses in nursing homes appear to be in the central, south central, bootheel, and northeastern parts of the state. Included in the 21 Primary Health Care Areas which have needs for additional licensed practical nurses in nursing homes are the relatively large trade center Primary Health Care Areas of Kansas City, Columbia, St. Charles, and Cape Girardeau.

Other Types of Employment

All 50 Primary Health Care Areas have requirements for masters(plus) RNs in this employment area, but only 18 are currently meeting a percentage of this requirement. The Warrensburg Primary Health Care Area is the only one which is meeting over 100 percent of its requirement (105.82%). The other 17 Primary Health Care Areas range from 9.27 percent in Sikeston Primary Health Care Area to a high of 63.10 percent in the St. Louis Primary Health Care Area. The Primary Health Care Areas which are meeting a percentage of this requirement for masters(plus) RNs appear to be located primarily in the northwestern, central, and southeastern portions of the state.

Again, all 50 Primary Health Care Areas do have some requirements for baccalaureate RNs in this employment area, but unlike masters(plus) RNs, a larger portion of the Primary Health Care Areas are meeting some percentage of these requiremtns. There are only 8 Primary Health Care Areas which are currently meeting zero percent of their respective needs for baccalaureate RNs. Nine are currently meeting 100 percent or more of these needs. There are 20 Primary Health Care Areas which are achieving at least 50 percent of their requirements for baccalaureate RNs. These 20 Primary Health Care Areas are generally located in the northern and central part of Missouri.

Of the 50 Primary Health Care Areas with requirements for diploma/associate RNs all but two (Ironton Primary Health Care Area and Unionville Primary Health Care Area) are meeting at least some percentage of these requirements. In fact, 42 of the Primary Health Care Areas are meeting at least 50 percent of their respective needs; and of these, 21 (or one-half) are presently meeting 100 percent or more of these requirements. With the exception of the north central part of the state, Primary Health Care Areas are quite well supplied with diploma/associate RNs in this employment area.

There are 27 (54%) Primary Health Care Areas which are currently meeting at least 100 percent of their requirements for licensed practical nurses in this employment category. Only Perryville Primary Health Care Area is not meeting any percentage of its required licensed practical nurses. Unlike the hospital and nursing home employment settings, many rural Primary Health Care Areas have requirements for additional licensed practical nurses. The Primary Health Care Areas which are meeting the highest percentage of their respective requirements for licensed practical nurses are scattered around the state in clusters. The major clusters appear to be located in the bootheel, south central, west central and southwestern parts of Missouri.

Many diploma/associate RNs must be employed in areas in which the applied criteria specify baccalaureate RNs. This would explain the large number of Primary Health Care Areas which meet 100 percent or more of their requirements for diploma/associate RNs in each of the employment fields. This holds true to a lesser extent for baccalaureate RNs employed in positions specified for masters(plus) RNs by the criteria. The same situation appears to be true when licensed practical nurses are concerned. The Primary Health Care Areas which lack 100 percent of their licensed practical nurses requirements seem to have over 100 percent of their diploma/associate RN requirements.

Hospitals

The state as a whole meets the least amount of its requirements in the category of masters(plus) RNs employed in hospitals (15.37%). As the table shows, it would require 974.85 additional full-time equivalent master(plus) RNs to meet 100 percent of this requirement.

The situation of baccalaureate RNs in hospitals is a little better with the state achieving 67.88 percent of its requirement.

When diploma/associate RNs are considered, the situation is reversed, with the state meeting 118.16 percent of its requirements. Obviously, there are many diploma/associate RNs working in positions which the criteria specify should be held by baccalaureate and masters (plus) RNs.

Nursing Homes

Of the three employment settings examined, this is the only one in which the state does not meet its requirement for licensed practical nurses. It would require 390.89 full-time equivalent licensed practical nurses employed in hospitals to reach 100 percent of the state requirement.

There are currently 9 masters(plus) RNs employed in professional and practical nursing homes while the criteria do not call for any. If these 9 are placed in the baccalaureate RN category, it would bring the percent of met need up from 45.83 percent to 52.08 percent. The state comes very close to meeting 100 percent of its requirement for diploma/associate RNs in nursing homes (94.12%) and does meet 110.19 percent of its requirement for licensed practical nurses in this employment field.

Other Types of Employment

The education distribution in this employment field is very similar to that of hospitals, with the state meeting a relatively small percentage of its requirement for masters(plus) RNs (38.35%), a larger percentage of its requirement for baccalaureate RNs (75.26%), and over 100 percent of its diploma/associate RN requirement (113.61%). But, unlike the hospital situation, the state is

meeting 110.19 percent of its requirement for licensed practical nurses in this employment field.

Total Registered Nurses

When registered nurses in all types of employment are examined, the educational distribution is again similar to that in hospitals and other types of employment. Only 24.67 percent of the requirements for masters(plus) RNs are currently being met while 68.98 percent of the baccalaureate RN requirement is persently being met by the active nurses in the state. Over 100 percent (115.28) of the state's diploma/associate RN requirement is being met. There are 15,619 currently active registered nurses in the state of Missouri; and, therefore, the state is meeting 103.59 percent of its registered nurse requirement (15,077). Unfortunately, information on type of employment and educational preparation was only available on 14,176 registered nurses. Therefore, it can only be assumed that the educational preparation of these additional 1,443 registered nurses are distributed in the same manner as the other 14,176. If this is true, it can be concluded that the state as a whole presently has an adequate supply of registered nurses, but that according to the criteria set forth by the Health Manpower Planning Task Force Nursing Manpower Team, the educational preparation of these registered nurses is not adequate. In other words, there is a greater current need for masters(plus) RNs and baccalaureate RNs than for additional diploma/associate RNs.

Total Licensed Practical Nurses

Even though Missouri is currently meeting over 100 percent of its statewide requirements for licensed practical nurses in two of the three employment settings, under examination, it is only meeting 97.83 percent of its overall state requirements for licensed practical nurses. It would therefore, appear that a distribution problem is present concerning the employment setting of the 6,783 currently active licensed practical nurses.

5.5.2 Conclusions

Several conclusions can be drawn about the nursing manpower situation in Missouri from the results obtained with the application of the model to relevant Missouri data. The data seem to indicate that Missouri does not face a critical overall shortage of nursing manpower as 103.6 percnet of the need for total registered nurses and 98 percent of the need for licensed practical nurses is being met by the available supply. However, the data presented involve numbers of nurses in the state without addressing the problem of the low number of nurses available for full-time employment by hospitals, nursing homes, and other agencies, at least in many areas of the state. While there will also be replacement needs for aging registered nurses and licensed practical nurses, the 34 registered nurse educational programs (enrolling 5,684 students as of the 1974-75 school year) and the 32 state approved schools of practical nursing (enrolling 1,237 students in 1974-75) in Missouri will provide a continual influx of young nurses into the state.

However, the data also indicate that the percentage of statewide met need varies by nursing educational levels. Only 25 percent of the need is being met for master's or above prepared registered nurses. This compares with 69 percent for baccalaureate nurses and 115 percent for associate/diploma nurses. Areas of the state that have nurse manpower shortages of higher degree level nurses, must employ nurses for positions that are not commensurate with their educational background. Thus, a licensed practical nurse may be circumstantially forced to perform duties which should require baccalaureate nursing preparation. The data indicate further that nurse manpower shortages do not vary to any great extent by employment setting. In the hospital setting the percent of met need for total registered nurses is 95.5 and for licensed practical nurses, 91.6. In the nursing home setting the percent of met need for total registered nurses is 87.2 and for licensed practical nurses, 110.8 In the "other employment" category the

percent of met need for total registered nurses is 91.8 and for licensed practical nurses, 110.2. Again, the main problem is that within these categories there are varying needs by educational level with graduate and baccalaureate nursing needs being insufficiently met.

6.0 Intervention Approaches to Address the Maldistribution of Health Practitioners

6.1 Introduction

A variety of intervention approaches have been employed to address the problem of maldistribution of health practitioners. Perhaps the earliest intervention attempted on a large scale was the Health Professionals Educational Assistance Act of 1971. The general intent of the Act was to increase the number of graduates of the health professions through a variety of programs. Capitation Grants provided financial assistance to schools for additional faculty and teaching facilities on the condition of enrollment expansion. Monies were made available to assist the start up of new health professions schools. Construction grants carried enrollment increase provisions. Financial aid programs were created for students of the health professions to further remove the barriers to enrollment.

The basic premise of the Health Manpower Training Act was that shortages of physicians and other health professionals which existed in many areas of the United States could be simply solved by increasing the number of graduates entering professional practice each year. These programs have succeeded in their objective to increase the numbers of health professionals entering practice annually. The number of U.S. medical school graduates has increased by slightly more than 85% in the 15 year period since 1963. Similar increases occurred in the other health professions. However, by the late 1960's and early 1970's it became apparent that increasing the number of graduates of health profession schools would not of itself eliminate the problems faced by underserved areas.

Maldistribution of health manpower was recognized as a major problem. Attention began to be focused upon identifying the factors which influence the locus of practice of health professionals with the intent that intervention techniques could be developed to stimulate increases in health manpower in underserved areas. These intervention efforts fall into four categories. The first relates

to education; the second to financial incentive; the third to health care facilities and the fourth to career placement assistance. Each of these is reviewed in subsequent sections of this chapter.

6.2 Education

A number of studies have examined the relationships which may exist among a variety of factors related to the educational program of the health professions student and the eventual place of professional practice. Three education related variables appear to offer potential as intervention techniques for action against the maldistribution of health professionals. These include geographic origin of the student prior to entrance into the health professions schools, off-campus undergraduate clinical education experiences (preceptorships) and postgraduate education experiences. Although there are interrelations among these three factors, they are reviewed separately below.

6.2.1 Geographic Origin of Students and Preference for Practice in Underserved Areas

There are many factors that influence the practice location of health practitioners and, in particular, physicians. Those factors which influence some physicians to practice in rural areas have been studied at great length. These investigations indicate that such a physician is strongly influenced by his preference for life in a small community, the opportunity to build a full practice quickly, and the influence of his family and friends.[1,2,3]

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(1) Parker, R.C., Jr., and Tuxill, T.C. The Attitudes of Physicians Toward Small Community Practice. Journal of Medical Education, 42:327-344, 1967.

(2) Bible, B.L. Physician's View of Medical Practice in Non-Metropolitan Communities. Public Health Report, 85:11-17, 1970.

(3) Riley, G.J., Wilie, C.R., and Haggerty, R.J. A Study of Family Medicine in Upstate New York. J.A.M.A., 208:2307-2314, 1969.

A recent study[4] by Taylor, Dickman, and Kane attempted to define the relationship between the physicians' childhood background and eventual location of practice, particularly rural practice. Their findings indicated that among those students who were definitely oriented either toward a rural or an urban area, the impact of their own background seems to be very significant. Twice as high a percentage of students with rural backgrounds planned to practice in rural communities as did students with urban backgrounds. At the same time twice as high a percentage of urban background students planned urban practices as did rural students. These differences are statistically significant (Chi square = 7.23 $p < .025$).

In a second study[5] Liccione and McAllister tried to determine whether or not medical students from urban hometowns have a different attitude toward medical practice in a rural environment than medical students from rural hometowns. Their findings indicate "that students from rural hometowns are significantly more likely to have a pro-rural medical practice stand significantly less likely to have a "middle-of-the-road" or anti-rural medical practice stand than students from urban hometowns ($p < .001$)."

A third study[6] by Heald, Cooper, and Coleman illustrates a strong relationship between the type of place in which the physician was reared and the type of place in which he chooses to practice.

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(4) Taylor, Mark, Dickman, William, and Kane, Robert "Medical Students' Attitudes Toward Rural Practice," Journal of Medical Education, Vol. 48, Oct. 1973, p.888.

(5) Liccione, William J., McAllister, Susan "Attitudes of First-Year Medical Students Toward Rural Medical Practice" Journal of Medical Education, Vol. 49, May 1974, pp. 449-451.

(6) Heald, Karen, Cooper, James K., and Coleman, Sinclair Choice of Location of Practice of Medical School Graduates: Analysis of Two Surveys R-1477-HEW November 1974. Rand, Santa Monica, California 90406.

Table 28

DISTRIBUTION OF PRIMARY CARE PHYSICIANS, BY URBAN-RURAL PLACE OF REARING AND PLACE OF PRACTICE[a]

Place of Rearing[b]	Place of Practice[b]		
	Urban	Rural	Total
Urban	640[c]	127	767
	83.4[d]	16.6	100.0
	80.3[e]	45.7	71.3
Rural	157	151	308
	51.0	49.0	100.0
	19.7	54.3	28.7
Total	797	278	1075
	74.1	25.9	100.0
	100.0	100.0	100.0

[a] Chi square equals 12.1 with 1 degree of freedom; $p < .001$.

[b] According to AMA's demographic county classification, counties in categories 1-4 are rural; counties in categories 5-9 are urban.

[c] Number of respondents.

[d] Row percentage.

[e] Column percentage.

Table 28 indicates a significant relationship between type of place of rearing and type of place of practice. Rural-origin students were much more likely to practice in a rural area after graduation than are urban-origin students.

Examination of Table 28 reveals that 151 (49 percent) of the 308 primary care physicians who were reared in a rural area eventually practiced in a rural area. However, only 127 (16.6 percent) primary care physicians reared in an urban area eventually practice in a rural area. The rural-reared medical student is three times as likely to choose rural practice as an urban-reared student. In

conclusion, the authors state "The most important explanation of a rural versus an urban practice location is the physician's place of rearing."

A recent study[7] completed by the University of Missouri-Columbia School of Medicine concerning its own graduates supports the thesis that hometown size and specialty choice are interrelated predictors of the community in which physicians practice. Physicians with non-metropolitan backgrounds were two to three times as likely to select non-metropolitan practice as physicians with urban backgrounds. Physicians entering family medicine were almost three times as likely to select non-metropolitan practice as physicians in other primary-care specialties. Presence of both predictors (non-metropolitan background and selection of family medicine) resulted in two-thirds selecting non-metropolitan practice. However, selection of family medicine by graduates with urban backgrounds or selection of other specialties by graduates with non-metropolitan backgrounds did not appreciably increase the likelihood of non-metropolitan practice. This latter finding indicates that both non-metropolitan background and selection of family medicine are important in predicting non-metropolitan practice location.

The idea that exposure to rural places, such as having grown up in a rural area, is an important predictor of practice location was given additional support in an analysis by Yett and Sloan.[8]

From the studies cited in this section, it is clear that practice location is related to the hometown size of the medical student and medical specialty choice. If maldistribution of physicians is to be addressed, these findings have obvious implications in the selection process.

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(7) Cullison, Sam, Reid, Christopher, and Colwill, Jack JAMA Vol. 235, No. 5, February 2, 1976, pp. 502-505.

(8) Yett, Donald E., and Sloan, Frank A., "Migration Patterns of Recent Medical School Graduates." Inquiry, 11:125-142, June 1974.

As Cullison, et al, state "In the area of medical school admissions, increasing emphasis on the selection of qualified applicants with rural backgrounds may increase the percentage of medical school graduates who are interested in either a non-metropolitan or small metropolitan practice. Currently, multiple solutions for the rural physician shortage are being pursued with little recognition of the potential impact that increasing admission of rural applicants might have upon this shortage. In order to increase the percentage of non-metropolitan students, medical schools should consider both increasing the percentage of acceptance of qualified rural students and implementing programs of recruitment of students from rural areas.[9]"

This conclusion is well in line with actions which are being considered and/or taken in a number of states. For example, in a recent report[10] prepared by the Tennessee Higher Education Commission entitled Perspectives on Medical Education and Health Care in Tennessee, it was recommended that "the two public medical schools be encouraged to expend special efforts in the recruitment, admission, and eventual placement of students from rural areas" in an attempt to address maldistribution of physicians in that state.

6.2.2 Off-campus Undergraduate Clinical Education Experience (Preceptorships)

History of Preceptorships[11]

The preceptoral method of teaching has always been a part of medical education in the United States. During colonial times, approximately 90 percent of practicing U.S. physicians were trained through preceptorships which were copied from the apprenticeship system in England and Scotland. By the early 19th

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(9) Cullison, et al, op. cit p. 3.

(10) Tennessee Higher Education Commission. Perspectives on Medical Education and Health Care, January, 1978.

(11) Taken from Steinwald, Bruce and Steinwald, Carolyn "The Effect of Preceptorships and Rural Training Programs on Physicians' Practice Location," Medical Care, Vol. XIII, No. 3, March 1975.

century, several medical schools were established in this country in which formal instruction was offered to supplement preceptoral education.

Medical schools retained their complementary role through the last decades of the 1800's. Two developments at the turn of the century caused a shift from study under individuals to study within institutions. Externally, scientific advancements in Europe, primarily Germany, impressed on American educators the need for basing medical study on scientific research. Internally, the Flexner Report in 1910 criticized the lack of clinical training within most U.S. medical schools. The heightened emphasis on scientific investigation and clinical training led to the demise of preceptorships as a major component in medical training.

Fifteen years after the Flexner Report, preceptorships reemerged in U.S. medical schools, although in a totally new context. With the formulation of programs at the Universities of Wisconsin, Michigan, and Vermont in the late 1920's, the term preceptorship began to assume its current meaning. These programs were designed to counteract the extreme emphasis on formal classroom study in medical training by giving the "average...student an opportunity to learn something of medicine as an art through close association with a series of preceptors selected because of their skill in applying the science of medicine in daily practice[12]."

During the Depression and war years, preceptorship programs were fairly dormant. With the exception of the Duke University program in 1938, no new preceptorship programs were instituted until the late 1940's.

The late 1940's and 1950's have been characterized by one observer as a period of "small revival" of the preceptorship concept[13].

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(12) Extramural Clinical Teaching. Bull. Assoc. Amer. Med. Colleges, 3:31, 1928.

(13) Wiggins, W.S. A Consideration of Preceptorial Medical Education in the United States. Journal of Medical Education, 32:116, 1957.

In 1949, 13 schools were reported to have had preceptorships, 21 had them in 1952, and by 1955 there were 25. The number of student participants jumped from 400 in 1949 to 700 in 1950 to 1,400 in 1955[14]. The increase in programs was by no means smooth, however, as five schools terminated their programs and three dropped and subsequently re-instated programs during this period. Although individual preceptorship programs had many formalized objectives during the 1950's, the most pervasive ones seem to have been the desire to expose students to a greater range of physician-patient experiences than could be obtained within the confines of the medical school and to encourage a greater number of students to enter general or family practice. Other motivations for implementation of preceptorships included attracting physicians to practice in rural areas and developing better relations between the medical school and the community.

Current preceptorship programs appear to focus primarily on exposing students to general practice in rural communities as a means of encouraging practitioners to establish practices in these areas. Since 1960 more than a dozen schools have instituted preceptorship programs whose main emphasis is in placing students in non-metropolitan communities.

Preceptorships have evolved from being the primary component of medical education in the U.S. to a supplementary program aimed at accomplishing specific objectives. During the past few decades, the emphasis has shifted from programs directed to augmenting the student's medical school experience to programs intended to influence physicians' specialty and practice location choices, especially in the latter. Efforts to develop preceptorship programs to remedy the maldistribution of physicians have been precipitated by interest and funding from federal and state government sources.

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(14) Medical Education Number. JAMA 144:126, 1950; 159:580, 1955; 190:605, 1964.

Rationale For Preceptorship Activity

One of the most important factors that influences a medical student's initial thinking about his choice of a specialty and practice location is the setting of his medical education. As medical schools developed during the first half of the 20th century, they often located in large metropolitan areas. The decision to locate schools in this type of setting was based primarily on the fact that teaching hospitals and physician educators needed by medical schools for teaching purposes were already located in metropolitan areas. Only a very few state-supported schools of medicine are located in rural areas and almost none of the private schools of medicine are located in non-metropolitan areas. For example, of the seven states that are contiguous with Missouri, only Iowa has its medical school complex in what would be considered a rural area.

For this reason medical students are not routinely introduced to medical problems of citizens from rural areas, and consequently cannot develop a familiarity and understanding of their health care problems and concerns. They may in fact develop myths and misconceptions concerning the people and medical practice in these areas.

Steinwald and Steinwald state that "Medical school training largely is urban-based and focused on problems seen in city teaching hospitals that provide an inadequate background for the rural practitioner. Almost all required student clerkships and residency programs are hospital-based and involve care of episodic acute illnesses. The day-to-day problems of the ambulant office patient with chronic disease or functional problems is not faced adequately. Health maintenance, preventive care, and health education rarely are considered because of the pressure of acute illness[(15)]." This provides even more reason for participation in preceptorship experiences.

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(15) Steinwald, Bruce and Steinwald, Carolyn, JAMA, Vol: 222, No. 9, Aug. 27, 1973.

The argument can be made that not every medical student is a likely candidate for practice in rural areas. However, even those non-primary care subspecialist physicians who practice in large metropolitan areas need to have some understanding of the problems faced by rural physicians. This familiarity will help them better understand those patients who are referred to them by physicians from rural areas.

Moreover, the fact that many preceptorship participants do not locate their practices in rural areas might even be viewed as a partial benefit in that some physicians, because of the preceptorship experience, may be prevented from making an error in practice site selection which would lead to costly relocations in the future.

Effect of Preceptorships on Practice Location

In addition to the educational importance of off-campus clinical education experiences, it has been found that these experiences are important in helping to influence the first practice location of many physicians.

The professional literature supports very clearly the notation that participation in rural preceptorship experiences is related to practice location.

In a recent study[16] by Heald, Cooper and Coleman, there was found to be a strong relationship between participation in rural preceptorship programs and the place of practice for primary care physicians. Table 29 illustrates that of the one-hundred and seventy-eight physicians surveyed who had participated in a rural preceptorship experience, forty percent (71 out of 178) were located in rural areas while out of nine-hundred forty-six physicians who had not participated in the experience only twenty-three percent (217 out of 946) were located in rural areas. The authors conclude that "rural preceptorships may be providing important exposure of medical students to the positive aspects of rural practice."

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(16) Heald, Karen A., Cooper, James K., Coleman, Sinclair, "Choice of Location of Practice of Medical School Graduates: Analysis of Two Surveys, R-1477-HEW, Nov. 1974.

Table 29

RELATIONSHIP BETWEEN PARTICIPATION IN RURAL PRECEPTORSHIP PROGRAM AND PLACE OF PRACTICE FOR PRIMARY CARE PHYSICIANS

	Place of Practice					
	Urban		Rural		Total	
Participation	No.	%	No.	%	No.	%
Yes	107	12.8	71	32.7	178	15.8
No	729	87.2	217	67.3	946	84.2
Total	836	100.0	288	100.0	1124	100.0

Chi square equals 10.0 with 1 degree of freedom; $p < .01$

The same study reported (Table 30) that of the medical students who participated in rural preceptorship programs, thirty-nine percent (187 out of 485) decided on primary care specialties.

However, of those students who did not participate only thirty percent (970 out of 3243) decided on primary care specialties.

Table 30

PARTICIPATION IN RURAL PRECEPTORSHIP PROGRAM

Participation	Total MDs	Primary Care MDs	Primary Care MDs Percent	Total
Yes	485	187	39	672
No	3243	970	30	4213

It might be concluded from this study that rural preceptorships may have an influence on primary care specialty selection as well as rural location selection.

In conclusion, preceptorships can be an important activity in introducing medical students (and other health practitioner students) to the problems faced in rural practice locations. The data suggest that preceptorship participants select rural practice locations and primary care specialties in greater numbers than those that do not participate in these experiences. However, there may be a pre-selection bias among students who select preceptorships; a relatively large percentage might have chosen rural locations and primary care specialties without this experience.

When rural training programs are considered in the context of the problem of addressing maldistribution of health practitioners, the limitations of such efforts should be recognized. It appears that preceptorship experiences may be helpful in affecting distribution of health practitioners. However, the real potential lies in reinforcing components of an overall strategy which addresses problems of isolation, shortage of support personnel and facilities, and unfamiliar life styles of rural areas.

6.2.3 Post-Graduate Education Experience

Upon completion of medical school training almost all students select to participate in either an internship and/or residency training program. If a student first selects an internship program it is usually followed by the addition of 3 to 5 years of study required for residency training. Numerous studies have been completed to determine the effect, if any, that post-graduate medical training has on the eventual location of the physician.

A study of all medical school graduates for the years 1945 and 1950 showed that 59 percent of 1945 graduates and 63 percent of 1950 graduates were practicing in the same state in which their residency training occurred[17]. The same study found that 42 percent of 1945 graduates and 48 percent of 1950 graduates were practicing in the same state as the location of their internship.

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(17) Weiskotten, H.G., et al, Trends in Medical Practice. Journal of Medical Practice, 35:12:1086, 1960.

Weiskotten suggests that three residential and educational factors may be involved. These are (1) the proportion of state residents attending medical school, (2) state medical school enrollment, and (3) graduate training in the state. It was reported that the location of one's residency appeared to be more important than the location of the medical school or any other factor in determining where a physician practices. Weiskotten found that of the graduates studied, 43.4% were practicing in the state where their medical college was located; 48.8% were practicing in the state where internship requirements were fulfilled; 59.3% were practicing in their home state; and 63.1% had located in the state of residency training.

In a study at the University of Kansas School of Medicine, internship and residency training in Kansas were shown to be "significantly correlated with eventual practice in Kansas[18]." Of the physicians participating in the study, 45 percent were practicing within 200 miles of their internship location. Of those who completed a residency in Kansas, 50 percent remained in Kansas to practice.

Another study[19] shows that when Minnesota medical school graduates enrolled in either an internship or a residency in Minnesota, retention rose to 60 percent. When they enrolled in both an internship and a residency, retention rose to 64 percent. Nearly half of all graduates from other medical schools who enrolled in both an internship and a residency in Minnesota remained in the state.

In another study, Yett and Sloan[20] investigated the hypothesis that the more contact a physician has with a state prior to his first practice location decision, the more likely he is to locate in the state. The influence of the sequence of contacts on the probability that a physician will locate in a state of previous contact was also investigated. Their analysis indicates that recently-trained physicians have a higher propensity to establish prac-

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(18) Martin, Ed, et al, Where Graduates Go. Journal of Kansas Medical Society, 69:84, 1969.

(19) Miller, Winston and Hill, Russell "Relationship Between Medical Education in Minnesota and Professional Location" Minnesota Medicine, April, 1973, p. 331.

(20) Yett, Donald and Sloan, Frank "Migration Patterns of Recent Medical School Graduates" Inquiry, Vol. XI, June 1974.

tices in states where their previous level of attachment (i.e., the "events" birth, medical school, internship, and residency) is strongest and most recent. The finding confirmed that policies designed to encourage resident training have a higher payoff in terms of physician retention than any other single medical training "event" (i.e., medical school or internship). Moreover, if residency is reinforced by any other attachment "event", these particular states stand an even better chance of retaining the physician involved.

In an attempt to analyze some of the factors which have relationships to the statewide distribution of physicians, Scheffler[21] collected data on per capita number of internships offered and per capita number of residencies offered. He then correlated that data with the per capita statewide distribution of physicians in the United States. The Pearson correlation coefficients were .90 and .89 respectively. Thus, while there are obvious links among all the phases of medical education, the per capita number of internships and residencies offered seem to have a strong and significant relationship to the per capita statewide distribution of physicians. The author suggests that "if a state or a particular area wishes to improve its per capita share of physicians, it might make efforts to provide more internship and residency programs... In the context of physician training, then, the most effective way to attract physicians to a location may be to increase the number of interns and residents that are being trained in that area."

The importance of postgraduate medical education and its influence on location has been well documented. In 1968 the Illinois Board of Higher Education realized the need to have significant numbers of graduates from medical schools in Illinois remain to practice

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(21) Scheffler, R.M. "The Relationship Between Medical Education and the Statewide Per Capita Distribution of Physicians". Journal of Medical Education, Vol. 46, November 1971, pp. 995-998.

in Illinois. This need became evident when the percentage of new physicians licensed was compared to the percentage of the total number graduated. Illinois ranks lowest of all the states in this respect. In 1965, Illinois graduated 6.8 percent of the physicians in the United States but licensed only 3.6 percent of the new additions to the field of medicine in 1966. In 1965 the five Illinois medical schools graduated 507 physicians, but only 211 of that number became licensed in Illinois in 1966. In response to this deficit of physicians a report[22] entitled Education in the Health Fields for the State of Illinois recommended the "development of sufficient internship-residency programs to provide quality training for the graduates of the medical schools in the State, in addition to those who come to Illinois from other states."

Similarly, in a report[23] of the Tennessee Higher Education Commission concluded that "the maintenance of strong, well-utilized internship and residency training in Tennessee hospitals is an important factor in overcoming the shortage of physicians."

Recognizing that graduate medical education is one of the most important parts in increasing the number of primary care physicians, the national Coordinating Council of Medical Education has stated that: "Institutions responsible for graduate education, including university-affiliated hospitals, should be encouraged to establish residencies in family practice, internal medicine, and pediatrics with an orientation toward primary care. These programs should have equal professional status with educational programs in the medical and pediatric subspecialties[24]." The Council continues by saying that "State governments and their agencies responsible for health and education should be aware of the documented fact that

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(22) Campbell, James, et al, Education in the Health Field, Board of Higher Education, Springfield, Illinois, June 1978.

(23) Boone, Jerry and Woods, Myra S. Medical Education For Tennessee - A Report of the Tennessee Higher Education Commission, February, 1971.

(24) Coordinating Council on Medical Education, Physician Manpower and Distribution - the Primary Care Physician, Chicago, Illinois, January, 1975.

the retention of physicians within their jurisdiction is to a significant degree dependent upon the location, the type, and the quality of residency programs within the state. Financial support directed to the development of high quality residencies in family practice, internal medicine, and pediatrics with orientation toward primary care, would almost inevitably be a sound inventment on behalf of the people within a state."

There is obviously a relatively strong correlation between the site of postgraduate educational experience and the eventual place of practice of the health professional, however, it must be pointed out that the studies described in this section have dealt with location of practice on macroscopic basis. It has not been established whether the health professional will relocate from the immediate geographic vicinity of the postgraduate experience to practice in adjacent underserved areas. It appears that further research, done on a more microscopic basis, is needed to determine whether health professionals do move out from the immediate geographic vicinity of their postgraduate experience to practice in more remote, underserved areas of the state.

6.3 Financial Incentives

Financial incentives sometimes are components of programs designed to influence health practitioners to select practice sites in underserved areas. The spiraling cost of health professional education, particularly medical and dental, makes financial aid important for a growing number of health science students. Increasingly, subsidy of health education is offered contingent upon service commitment in a shortage area. Loan forgiveness programs, scholarship grants, tuition subsidies and waivers, and tax exemptions for practice are all available in return for service upon graduation.

6.3.1 Scholarship and Loan Forgiveness Program[25]

The Illinois Medical Student Loan Fund is sponsored by the

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(25) Sax, Ellen Incentive Programs Promoting Practice in Underserved Areas. National Health Council New York, New York 10019.

Illinois State Medical Society and the Illinois Agriculture Association. This program assists fifty medical students with individual loans up to $6,000 over a four-year period. All recipients are Illinois residents who have been accepted at one of the four University of Illinois College of Medicine campuses. Loans are granted at 4% interest. Repayment of the principal and interest begins January 1 of the fourth year following graduation from medical school, thereby allowing for completion of three years of residency training.

A unique feature of this program is the policy of the Loan Fund Board to screen candidates and recommend several for admission to the University of Illinois. The Fund annually screens approximately 150 students and recommends 35-40 for acceptance; of those, 35 or more are usually admitted. In return, the student must agree to practice medicine in an Illinois town serving a rural area. Selection of the specific community is left to the student, but the area must have a documented physician shortage and be approved by the Fund's Board. A new feature of the program allows students to receive one-half year credit toward their medical practice obligation for each full year spent in a primary care residency, if training is taken in Illinois but outside Cook County (Chicago). For example, a student who completes a three-year residency in family practice in downstate Illinois will have fulfilled one and one-half year's obligation toward the total practice commitment. Those wishing to buy out of the agreement must repay the amount borrowed plus 8% interest and a $1,000 penalty per year for each year of unfulfilled contract time.

Overall, the program has an 80% success rate. Since the program's inception in 1948, 70 physicians have located their practices in rural Illinois as a result of the loan program. A higher success rate is anticipated in the future since the program was originally open only to those going into general practice medicine and attracted a relatively small number of students. Now the program is open to those entering family practice or primary care specialties (including internal medicine, obstetrics/gynecology, and pediatrics),

and is attracting twice the number of applicants. In an evaluation of the Illinois Medical Student Loan Fund, Mattson, Stehr, and Will states that:

"The program has been effective in general and has been particularly effective for those individuals who have joined the program after matriculating at the University of Illinois College of Medicine[26]."

The Rural Kentucky Medical Scholarship Fund[27], established in 1946 for the purpose of influencing physicians to practice in rural Kentucky, reports a 96% success rate; currently, 196 physicians are practicing in rural counties of Kentucky as a result of the loan forgiveness program. Of these, 34 MDs have chosen practice sites in critical counties where the ratio is 1 MD per 4,000+ population. Tuition loans up to $3,500 per year per student are granted by the Scholarship Fund. Appropriations come from the Kentucky State Legislature, physicians, civic-minded individuals, business and industry. Applicants to the Fund must be Kentucky residents who have been admitted to either the University of Louisville or the University of Kentucky Colleges of Medicine. Since most of the state is rural, practice in a shortage area is permitted in 113 of Kentucky's 120 counties. However, the rate of forgiveness varies according to the type of rural area selected. Each year the Board of Trustees of the Fund approves a list of critical counties (26 in 1975-76), considered most in need of physicians. Any scholarship recipient who will practice in one of these counties will be forgiven one annual loan for each full year of service in a critical area. If a semi-critical county is selected (87 in 1975-76), the student must pay back the loan plus 2% interest. If the scholarship recipient prefers to buy out of the program, he or she must repay the amount borrowed plus 8.5% interest and a $5,000 penalty for "liquidating damages." Since its inception in 1946, only three recipients have opted to buy out, and a few have left the program for personal or

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(26) Mattson, Gale, Stehr, Donald, and Will, Roy. "Evaluation of a Program Designed to Produce Rural Physicians" Journal of Medical Education, Vol. 48, April 1973.

(27) Sax op. cit p. 15.

academic reasons. Currently, 40 medical students at the University of Louisville and the University of Kentucky are receiving loans through the forgiveness program; 17 of these are freshmen, indicating an increased interest in the program.

In an attempt to address maldistribution through loan forgiveness programs, the State of Missouri has recently passed legislation[28] which relates to financial aid for the education of students in certain health professions. This legislation allows eligible students to apply to the State Board of Health for loans not to exceed $6,000 for each academic year that he or she is pursuing a course of study directly leading to the degree of Doctor of Medicine or Doctor of Osteopathy. However, one-fourth of the interest and principal of the total loan at the time of the awarding of the degree shall be forgiven for each year of participation by an applicant in the practice of his profession in a rural area or an area of defined need. With this financial incentive it is hoped that new physicians will seek opportunities in areas usually not considered for practice.

Although the data of programs in Illinois and Kentucky indicate that loan forgiveness programs can be successful, many programs have fallen short of their goals. In a study of seventeen programs that evaluated the effectiveness of student aid programs tied to a service commitment, Mason found that "only eleven were in existence long enough to have a substantial number of physician-borrowers who had completed their education and had, therefore, made a choice of repaying their obligation by practice in an area of need or by returning the funds which they borrowed. It is significant that only one program has had outstanding success over its 25-year history, while the majority of states are fortunate if 60 percent of the borrowing physicians follow through by practicing in the rural areas of their states. In all of these programs, one-third of physicians chose to buy out of their obligation to practice in a

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(28) House Bill No. 884, State of Missouri, 79th General Assembly, 1978.

small community[29]." In a recent report[30] the Tennessee Higher Education Commission has confirmed the apparent lack of success with loan forgiveness programs. It states that "Nationally, efforts to attract physicians to rural or underserved areas through loan forgiveness programs have met with mixed but generally not very good success. Students participating in such programs - whether sponsored by private foundations, state or federal funds - have found it easy to buy out of their commitments to practice in shortage areas." Harrell has stated that "Programs of scholarships or forgiveness of loans, if the student practices in an area of need, largely have been failures and students have preferred to repay the funds advanced rather than serve in a place dictated by a committee or an agency[31]." On the positive side, the National Commission on the Cost of Medical Care has pointed out that, "The coupling of loan forgiveness programs with active recruitment of students from rural and underserved areas is recommended as having a combined positive influence in returning physicians to these areas[32]."

In making judgments about the success or lack of success of "forgiveness" programs, one must remember that such agreements are usually made by medical students previous to entering medical schools. At this point in their career they are usually undecided about what type of practice they may eventually want and where that practice will be located. Speaking of his students in relation to the types of programs discussed in this section, one medical school dean said, "As an individual enters medical school, he usually has insufficient knowledge of the various fields of medicine to really know what type of practice he will eventually want to engage in.

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(29) Mason, Henry R. "Effectiveness of Student Aid Programs Tied To A Service Commitment", Journal of Medical Education, Vol. 46, July 1971.

(30) Tennessee Higher Education Commission Perspectives on Medical Education and Health Care in Tennessee, January, 1978.

(31) Harrell, JAMA, Vol. 225, No. 9, August 27, 1973.

(32) National Commission on the Cost of Medical Care, Summary Report, 1977, The American Medical Association.

Many have observed only general practice in a smaller community, and at the time they entered medical school this is their primary concept of medical practice. Consequently, they may commit themselves to general service as freshmen only to find later that another field of medicine is the one that appeals to them." On the other hand, students from urban areas may agree to service in a rural area only to find upon graduation that the setting is totally foreign and unacceptable to them.

6.3.2 National Health Service Corps

The National Health Service Corps (NHSC) was established under provisions of the Emergency Health Personnel Act of 1970[33].

The legislation authorized establishment of an administrative unit within the U.S. Public Health Service to improve the delivery of health services to underserved communities and areas. Personnel are assigned to areas designated by the Secretary of HEW as having critical health-manpower shortages, but only upon request of a state or local health agency or other public or nonprofit private health organization. The need also has to be certified by district medical or dental societies and by the local government of the area. Health facilities of the area are to be utilized, but when they were lacking, facilities could be leased or otherwise provided or the nearest health facilities of the U.S. Public Health Service could be utilized. Establishment of the National Advisory Council on Health Manpower Shortages was also authorized.

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[33] Public Law 91-623, December 31, 1970.

Table 31

National Health Service Corps - Missouri

Below is a list of cities and counties that have, or had, at least one National Health Service Corps physician for the designated year.

1977		1978	
City	County	City	County
Princeton	Mercer	Galmey	Hickory
Winona	Shannon	Kansas City	Jackson
Marble Hill	Bollinger	Maysville	DeKalb
Van Buren	Carter	St. Louis	
		Princeton	Mercer
		Winona	Shannon
		Marble Hill	Bollinger

Below is a list of cities and counties that have, or had, at least one National Health Service Corps dentist for the designated year.

1977		1978	
City	County	City	County
Centerville	Reynolds	Centerville	Reynolds
Gainesville	Ozark	Gainesville	Ozark
Marble Hill	Bollinger	Humansville	Polk
Van Buren	Carter	Kansas City	Jackson
Vienna	Maries	LaGrange	Lewis
Winona	Shannon	Vienna	Maries
		Winona	Shannon
		Marble Hill	Bollinger

These data suggest that the National Health Service Corps has the potential to provide physicians for shortage areas, however,

to date it does not appear to be meeting the needs of Missouri. Experience with the program is not yet sufficient to determine if these physicians and dentists will remain in their assigned place of practice once their obligation to the National Health Service Corps has been completed. The National Health Service Corps along with other loan and scholarship programs which require service in underserved areas are all dependent upon students electing to use them. The extent to which students are willing to make a commitment to practice in an underserved area will strongly influence their acceptance of these programs. Thus, the motivation to practice in an underserved area probably must already exist prior to when a student elects the program. This would be especially true where alternative sources of loan and scholarship money are readily available. These programs may indeed be only important adjuncts to facilitate the educational process of persons who are already strongly committed to practice in rural areas.

6.4 Health Care Facility Construction

Well before the formulation of the Health Professionals Educational Assistance Act as an intervention technique, programs to assist communities with the cost of constructing necessary health care facilities were developed as a potential means of improving accessibility to the health care. These programs essentially operated on the principle that if the appropriate facilities were available, health practitioners would locate close to these facilities. The earliest of these programs was the Hospital Survey and Construction Act (The Hill-Burton Act) and the second was the Community Medical Assistance Program established by the Sears Roebuck Foundation.

6.4.1 Hospital Survey and Construction Act

In 1946 the Congress enacted the Hospital Survey and Construction Act. This Act, which was commonly known as the Hill-Burton Act, provided funds for the construction of hospitals in underserved areas. According to the AMA, this act would "contribute materially to a better distribution not only of hospitals but of physicians and medical care generally[34]." Since 1946, 240 separate grants for a total of $99,361,000 has been spent in the Boonslick, Bootheel, Lake of the Ozarks, Meramec, Missouri Valley, Northwest Missouri, and South Central Ozark Regional Planning Commission Areas of Missouri[35]. With the help of the Hill-Burton Act the State was able to provide 11,529 additional hospital beds for the entire State, and 1,362 additional beds in those seven Regional Planning Commission Areas[36]. In 1978, however, those RPC's are still considered high need areas. According to HEW standards they are classified as medical shortage areas because they have less than 6.7 MDs per 10,000 population, and are among the most underserved areas in the State.

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(34) House of Representatives, Report No. 2519, Committee on Interstate and Foreign Commerce, 79th Congress, 2nd Session Washington, D.C., 1946.

(35) See Appendix 1.

(36) See Appendix 11.

The data suggest that the Hill-Burton Act did little to address the maldistribution of physician manpower in these areas.

Nationally, the results of this Federal effort were about the same. Over a period of years, a number of small hospitals of 50 beds or less were built under the Hill-Burton Program. They have proven to be uneconomical in operation, and the volume of work has not been conducive to the development of adequate quality control on professional activities or laboratory studies. This construction program has generally been recognized as not filling needs and, for the most part, has been stopped. Despite the increase in the number of hospitals and accompanying bed capacity, maldistribution remains a serious problem in Missouri.

6.4.2 Community Medical Assistance Program (CMAP)

The CMAP was established by the Sears Roebuck Foundation in 1957 as a means to assist rural communities to build clinics and thus to attract physicians. CMAP provided selected communities with various forms of technical assistance. To become eligible a community surveyed itself with an instrument (provided by the Foundation) designed to assess whether the community could economically support a physician. Once enrolled in CMAP, the community was provided with a set of architectural plans for a clinic building, visits by architects to supervise construction, and information on fund-raising, including instructions on how to form a non-profit corporation. Usually the clinics were financed by townspeople purchasing stock in such a corporation rather than by donation. The corporation would then rent the clinic building to the physician. Although the Foundation did not directly pay for the construction of these clinics, it did maintain a staff for the project and supported a physician-advisory board appointed by the American Medical Association. The project had been in existence thirteen years when the Foundation re-evaluated its priorities in 1970, and was discouraged by the fact that one-third of the built clinics were then unoccupied.

It is important to note that despite the success in providing help to build facilities for underserved areas, communities found it difficult in trying to keep health care practitioners to staff these facilities.

6.5 Career Placement Assistance

In Chapter I of this document it was noted that the current supply of certain health practitioners (medicine, dentistry, pharmacy, and nursing) appeared to be adequate to serve the current needs of the state. The problem in Missouri is a maldistribution of those practitioners. One of the contributing factors to this maldistribution problem appears to be the lack of a coordinated effort to match the supply of health practitioners with practice opportunities and positions. In the process of developing the Roster of Placement Programs[37] the National Health Council recognized a major gap in activities designated to alleviate maldistribution of health practitioners. This problem has become more acute with the success of the Area Health Education Centers and various incentive programs. That is, health science students who are interested in shortage area practice are completing their studies; interested in fulfilling needs, they are now faced with the practical problem of finding positions in the communities where they are needed.

Currently there are eighteen states or regions that have placement services specially designed to place health professionals in shortage areas. In addition, there are placement services provided by national health professionals in shortage areas, serving both shortage and non-shortage areas. In some national health professional organizations, placement is done by the affiliated state organizations, rather than by the national office. Another placement effort is the Military Experience Directed Into Health Careers (MEDIHC) program. MEDIHC, which was started in 1970, is a federally-funded program designed to help veterans direct their military experience and training into health careers. Although it is a federal program, MEDIHC functions on a state basis. MEDIHC offices provide other services and counseling for veterans, placing veterans in health training programs, in health positions, etc. - within the borders of its own state. Since MEDIHC emphasized services for returning Vietnam

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(37) Brown, Marsha and Warner, Ann Roster of Placement Program National Health Council, New York, New York 1977.

War veterans, many MEDIHC offices have ceased functioning recently, and their services, where necessary, are now provided by other programs or departments. Several other placement services exist which can be utilized by health professionals. Some of these are formal services, frequently limited to one discipline, and geographically, to one state. State nurses' associations, for example, often conduct placement services for their members. In some cases, they cooperate with the state agency which operates a nurse registry.

In general, a health practitioner placement service is an administrative mechanism which seeks to identify health professionals who are seeking employment or professional opportunities and match them with employment positions and professional opportunities. The placement service can provide an important role in helping to address maldistribution, yet it must be clear that this kind of service cannot be considered as the single solution to the many problems in attracting health professionals to shortage areas. Placement must be viewed in perspective: it properly belongs as one step along a continuum of programs and activities which are designed with the purpose of addressing the maldistribution problems of health manpower. These include but are not limited to: health career education for elementary and secondary school students, recruitment programs in shortage areas, health science schools' admission policies, retention programs, student exposure to shortage areas, preceptorships, curricula which emphasize primary care and shortage area practice, educators who can serve effectively as role models for students interested in primary care and shortage area practice, and financial and other incentives. Placement services for shortage areas, in fact, are most effective when they are linked directly to one or more of these activities. Isolated from other forms of encouragement, a placement service would probably not be very effective in attracting health professionals to shortage areas.

The University of Missouri-Columbia actively attempts to match communities needing physicians with medical alumni at the time when they complete their residency training[38]. The program is conducted by Dr. William C. Allen of the Department of Family and Community Medicine. Dr. Allen maintains a file on those communities in Missouri which are seeking physicians. A brief paragraph is prepared for each community containing descriptive information important to practice-seeking physicians. These paragraphs are compiled into a list termed Practice Opportunities by Dr. Allen. Practice Opportunities is mailed to UMC graduates who are thought to be nearing completion of their residency training. A cover letter from the Dean of the School of Medicine offers to assist the physician in contacting any community on the list. This program is coordinated with the Missouri State Medical Association and the Missouri Academy of Physicians.

A study[39] prepared by Levine, Mares, and Nuessle assessed the first practice location of recent graduates from the UMKC School of Pharmacy with respect to need. The authors strongly recommended that "Placement service should be established, in part to help direct graduating students to potentially attractive locations that need additional pharmacists."

Specific recommendations were that this service could:

- inform graduating and recently graduated students of the specific opportunities which do exist in high need counties, and explain advantages which may be unique (but not immediately apparent) in a particular community (e.g., few or no community pharmacies are located in nearby towns).

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(38) Private communication with William C. Allen, M.D., Department of Family and Community Medicine, School of Medicine, University of Missouri-Columbia.

(39) Levine, Daniel U., Mares, Kenneth R., Nuessle, Noel. "Need for Pharmacists and Relationships With Student Geographic Origin, Externship Assignment, and Subsequent Location of Practice Among 1975 and 1976 Graduates of the UMKC School of Pharmacy." Five-year Project Report of the Western Missouri Area Health Education Center - University of Missouri-Kansas City, 1977.

- stimulate efforts in these counties to build a better community base for attracting new pharmacists. For example, by working with local groups to identify advantageous facilities at which to locate an office.
- facilitate contact between community groups or individuals interested in attracting pharmacists and potential recruits from the School of Pharmacy.
- work with local, state, and federal officials as well as UMKC administrators in developing information useful for placing graduates in high need areas. For example, an effort could be made to identify communities in which there are sufficient numbers of newly-arrived physicians to support the establishment of a new pharmacy.

It should be noted that a placement office sufficiently funded to carry on these activities also could function to place graduates of the Schools of Dentistry, Medicine, and Nursing in high need communities.

In June, 1976, the Missouri Health Manpower Analyses recommended that "The Missouri State Health Planning and Development Agency encourage the establishment of a statewide placement service in conjunction with the five Missouri Health Systems Agencies, the professional associations of Missouri, and the examining boards in Missouri, which would contain information on health professional shortage areas and a current list of available practices and health professionals who are seeking associates, auxiliary personnel, and/or partners. Community profiles of areas requiring health services should be available to all professionals seeking a practice location. The Missouri State Health Planning and Development Agency should make this service available to each professional school and the national professional associations[40]. This ranked fourth out of 44 recommendations contained in the Missouri Health Manpower Analyses.

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(40) Fox, Lyn, Hicks, Lanis, and Lane, Gayle, Missouri Health Manpower Analyses: Summaries, Conclusions, Recommendations. Missouri Division of Social Services. June, 1976, p. 142.

6.6 Summary and Conclusions

From an analysis of the intervention techniques and research studies summarized in this chapter, it appears that there are a variety of factors which favorably influence a health professional's decision to practice in an underserved area. There may be other factors in addition to those described in the chapter which are, as of yet, unrecognized but which have important bearing on the maldistribution problem. Further research should be undertaken in an attempt to identify these factors. In the absence of this additional information and dealing with information presently available it would appear that a multifaceted approach is needed which incorporates as many factors as possible that are known to influence a health professional to locate in a geographically underserved area. It appears that a most effective program would be one which:

1. Attempts to recruit significant numbers of students from geographic areas of the state which are presently underserved with respect to health manpower.
2. Provides such educational assistance as may be necessary to assure the retention of these students once admitted to the health professions school.
3. Re-enforces these student's contacts with practice in their own or other geographically remote area via preceptorship programs.
4. Attempts to have readily available for these students postgraduate programs in their own state which prepare them for primary care practice and which include components that allow these persons to complete a portion of their postgraduate experience in underserved/rural settings.
5. Includes a program for financial assistance which contain forgiveness clauses for service in underserved areas at the end of the postgraduate experience but which are binding and do not contain buy-out provisions.

6. Makes available a placement assistance program where persons completing postgraduate programs can be made aware of opportunities existing in shortage areas.

7. Have available a consultant service and development grants to assist communities in providing the working environment conducive to attracting the appropriate health care professionals.

APPENDIX 1

Hill-Burton Grant Funds Expended in Missouri by Medical Shortage Regional Planning Commission Areas

Areas	Counties	Amounts
Boonslick	Lincoln	483,000
	Montgomery	0
	Warren	0
Bootheel	Dunklin	1,149,000
	Mississippi	0
	New Madrid	0
	Pemiscot	950,000
	Scott	1,343,000
	Stoddard	588,000
Lake of the Ozarks	Camden	0
	Laclede	401,000
	Miller	0
	Morgan	147,000
	Pulaski	511,000
Meramec	Crawford	0
	Dent	663,000
	Gasconade	450,000
	Maries	0
	Phelps	742,000
	Washington	329,000
Missouri Valley	Carroll	401,000
	Chariton	0
	Saline	632,000
Northwest Missouri	Atchison	0
	Gentry	174,000
	Holt	0
	Nodaway	1,267,000
	Worth	0
South Central Ozarks	Douglas	0
	Howell	965,000
	Oregon	0
	Ozark	0
	Shannon	0
	Texas	259,000
	Wright	925,000
	TOTAL AMOUNT	$12,379,000

APPENDIX 11

Number of Beds Provided by Hill-Burton Grant Funds For Missouri in Medical Shortage Regional Planning Commission Areas

Areas	Counties	Number of Beds
Boonslick	Lincoln	70
	Montgomery	0
	Warren	0
Bootheel	Dunklin	160
	Mississippi	0
	New Madrid	0
	Pemiscot	165
	Scott	106
	Stoddard	50
Lake of the Ozarks	Camden	0
	Laclede	35
	Miller	0
	Morgan	40
	Pulaski	50
Meramec	Crawford	0
	Dent	38
	Gasconade	35
	Maries	0
	Phelps	150
	Washington	30
Missouri Valley	Carroll	40
	Chariton	0
	Saline	82
Northwest Missouri	Atchison	0
	Gentry	31
	Holt	0
	Nodaway	117
	Worth	0
South Central Ozarks	Douglas	0
	Howell	77
	Oregon	0
	Ozark	0
	Shannon	0
	Texas	35
	Wright	51
	TOTAL BEDS	1,362

7.0 The Role of Area Health Education Centers

The discussion in Chapter Three leads to the conclusion that fragmented, uncoordinated attempts to improve the distribution of health manpower have not been successful. In this chapter we will describe an approach -- area health education centers -- which has been developed with the twin goals of improving the distribution of health care providers and of improving the quality of health services.

This chapter begins with a discussion of the factors which influence health manpower distribution. We indicate the points at which university (i.e., educational) intervention may be expected to be helpful and we identify those areas which are not amenable to change through educational efforts. Next we briefly review recent health manpower initiatives and the background of the area health education centers idea. Finally, we describe the generic elements of the concept and comment upon the initial evidence of the impact that those programs have had.

7.1 Factors in Health Manpower Distribution

The causes of the shift away from rural and inner-city areas toward suburban and small metropolitan centers among health professionals over the past several decades are numerous and complex. This trend mirrors the migration of American society.[1] Like many others, health professionals increasingly seek the life style and amenities of suburban and smaller metropolitan communities.

Changes in the practice of modern health care have also contributed to this trend. As we noted above, increasing numbers of some types of practitioners have chosen specialty and subspecialty practices over the past several years. Physicians and dentists often require a large base of population and sophisticated

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(1) Rushing, W. A. and G. T. Wade, "Community-Structure Constraints on Distribution of Physicians," Health Services Research, Vol. 84, No. 4 (Winter), 1973, pp. 283-297.

equipment and facilities. Nursing does not require these but finds limitations placed on their practice location by the location of employing hospitals and physicians. The preference among younger physicians and dentists for group practice, requiring a large population and economic base means many smaller towns and rural areas are not well-suited to modern practice and magnitude of nursing services are not recognized and compensated adequately.

In addition, the movement away from rural practice locations may be a function of the educational process in Schools of Medicine. Much of the clinical training of physicians takes place in referral centers, where the students are often exposed to tertiary-level cases. Opportunities for systematic exposure to primary care practice are often limited to medical students. Medical school faculties, the students' role models, are usually specialists and sub-specialists. The education of physicians may not equip the students, either in terms of skills or of values, to practice in currently under-served areas. Although nursing education usually includes primary care and rural community experiences, lack of financial support for nurses has enhanced the dependence on husbands for support of families and therefore has opportunity to practice in a rural setting.

Research studies have identified an enormous number of specific variables which contribute to health manpower distributional patterns: one recent report began with a list of 61 items ranging from climate to specific practice opportunities.(2) In this and most other such studies, only variables effecting medicine are considered.

Our analysis indicates that these various lists may be reduced to four general factors: (1) the social environment;

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(2) Council of Planning Librarians, exchange bibliography #1073, "Factors Influencing the Rural Location of Doctors and Students of Dentistry, Medicine, and Osteopathy," Houston, Texas: The University of Texas Health Science Center at Houston, n.d., an annotated bibliography.

(2) the professional environment; (3) economic considerations; and, (4) health professions education.[3] Each of these factors appears to contribute significantly to the current distribution. Although the relative importance and interaction among these factors is not well understood, the literature on health manpower distribution and the practice location decision process of health professionals clearly support the view that all four components are central to the problem.[4]

The first important factor in health manpower distribution -- the social environment -- has not been a target for intervention. It is unlikely that any initiative, no matter how massive its scope, could fundamentally alter the social, cultural, and religious dimensions of currently under-served areas to render them more attractive to physicians and other health professionals. Nor should such an effort be undertaken. Health professionals attracted to urban and suburban practice settings by conditions in the social environment should continue to serve those resident's needs.

The professional environment of rural and, to a lesser extent, inner-city practice locations is not likely to be as well developed as suburban and smaller metropolitan places. By definition the number of colleagues is small in rural areas and opportunities for referral and consultation are consequently less available, as are opportunities to share emergency room and practice coverage and other burdens. These conditions may not be unsatisfactory in rural practice but they are not likely to be positive aspects of a rural setting.

In addition to peer group considerations, the professional environment is influenced by the type and quality of support personnel and by available practice facilities. For most physicians, especially younger ones, the modern medical practice requires the

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(3) Stiles, G. M., "Approaches and Issues in AHEC Evaluation," Health Resources Administration, Rockville, Maryland, 1976.

(4) Grimes, R. M., Lee, J. M., Lefko, L. A., and Hemphill, F. M., "A Study of Factors Influencing the Rural Location of Health Professionals," Journal of Medical Education, Vol. 52, September, 1977, pp. 771-773.

presence of a diverse and well-trained group of nurses and allied health professionals. If a community is unable to attract and support these health workers it is unlikely to meet its needs for physicians. Similarly, the relationship between facilities (especially hospital beds) and the recruitment of new physicians is unclear. Evidence exists, from Hill-Burton experiences, suggesting that facilities are a necessary, but not a sufficient, factor in the recruitment process. This appears to be the case for all of the items in the professional environment: each must be minimally satisfied as a necessary condition of physician recruitment and retention, but none alone is a sufficient condition. For most nurses, inadequate numbers of well prepared nursing colleagues and other health professionals produces a sense of isolation.

The fundamental difference between the professional and social environments as foci for intervention is of primary importance to an adequate understanding of the issues under discussion here. Physicians and other health professionals attracted to urban or suburban practice locations by factors inherent in the social environment are not appropriate targets of distribution strategies; it is neither possible nor desirable to recreate the urban setting in under-served areas. Health manpower programs cannot bring theater, art galleries, or even a good delicatessen to rural areas, and those motivated by these considerations are not likely to be productive targets.

Conversely, it is both possible and highly desirable to alter certain aspects of the professional environment to enhance the attractiveness of under-served regions. Consultations and referral services can be provided by practitioners who are not local residents; many medical schools, for example, provide these services to outlying areas through regularly scheduled clinics, grand rounds, or other programs. Nursing school faculty assess the educational needs of nurses practicing in rural settings and arrange workshops to help meet the specific needs. Educational programs for health professionals can provide exposure to new knowledge and help ensure a high level of quality of care. The

introduction of non-physician primary care providers can free the physician to take care of medical needs while allowing other health professionals to provide services for which they have been prepared. Relief assignments can aid vacations and continuing education. There are a variety of effective intervention techniques to improve the professional environment.

Recent research indicates that a substantial number of health professionals (especially physicians) have chosen urban or suburban practice locations because of characteristics of the professional environment.[5] Many of these physicians express a preference for the social environment of smaller communities, but this preference has been sacrificed because of the importance of factors in the professional environment: a substantial number of physicians chose to practice in urban settings even though the social environment of rural settings is appealing. To our knowledge, a comparable study of nurses has not been done. Intervention strategies which improve the professional environment of under-served areas, coupled with efforts to identify those health professionals for whom the social environment of these areas is preferable (or acceptable), would appear to have a high potential for success.

Economic considerations are clearly important to the practice location decision. Recent research supports this position and indicates that they "...are amenable to policy manipulation."[6] But clearly, such manipulation is not the province or responsibility of the university directly. However, as leaders in new knowledge and methodology, attention can be drawn to such issues as effects of socialization on economic incentives for health professionals.

In general, rural and inner-city physicians and dentists earn less than their suburban and smaller metropolitan colleagues, regardless of specialty or type of practice.[7] This may be because

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(5) Coleman, S., "Physician Distribution and Rural Access to Medical Services," Santa Monica, California: Rand Corporation, Nov. 1975.

(6) Ibid.

(7) Werner, Judith and Phil Aherne (eds.), Profile of Medical Practice, Chicago: Center for Health Services Research and Development, American Medical Association, 1974, p. 192.

of a) inability of the target populations to pay for medical and dental services (based on smaller incomes), b) third party reimbursements (including Medicare and Medicaid), which are based upon "usual and customary fees", or, c) other factors. Financial differences by location of practice are not large but they do not represent a positive inducement for dentists and physicians to practice in currently under-served areas. Only recently has there been any real attempt to ensure payment to nurses through third party payers. Pay for nursing services is often not equal to that offered in urban settings and little attention is given to level of preparation of the nurse.

The fourth major factor -- health professions education -- has been the focus of numerous intervention strategies. Capitation has increased the aggregate supply of health manpower, to the point where many experts now believe that future supply will be at least sufficient to meet estimated needs. Research monies, principally from the National Institutes of Health, have expanded bio-medical knowledge and technology and have contributed significantly to the educational process. The impact of these resources on physicians has been to expand the development of specialty and sub-specialty disciplines at the expense of primary care disciplines in medicine, exacerbating the specialty distribution problem. Other programs, including the Regional Medical Program, have been aimed at translating advances in medical science into more effective care through a) the continuing education of practicing professionals, b) support for regionalized systems, and c) changes in medical education programs. Capitation and other funding from the Nursing Division of HEW has provided funding for learning experiences for student nurses in rural settings and primary care nurse practitioner programs.

Several important dimensions of the educational process remain beyond the reach of outside intervention or have proven highly resistant to change. Examples include, a) the self-selection of students into health careers,[8] b) rigid departmentalization

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[8] Cullison, S., J. C. Reid, and J. M. Colwell, "The Rural-Urban Distribution of Medical School Applicants," Journal of Medical Education, Vol. 51, January 1976, pp. 47-49.

of most medical schools, c) the high value placed upon research activities compared with teaching and service functions, and relative value placed on importance of various health professionals, and role of women in society, limiting the ability of some institutions to respond to some initiatives. Therefore, intervention in the education process may not offer a panacea for all problems of health manpower distribution. At best, it deals with certain parts of a multi-faceted phenomenon.

In summary, the issues of health manpower distribution and the accessibility of high quality health services are complex, difficult questions. They are, in part, manifestations of broad social trends which are clearly beyond the effective reach of categorical interventions. They reflect such diverse underlying factors as the value structure of our society, modern technology, barriers to entry into highly prized professions, barriers to practice, and the rising expectations of our citizens. They are, to use an appropriate metaphor, a 'chronic' rather than 'acute' social problem. The preceding analysis also suggests, however, that targeted intervention in selected dimensions of health manpower distribution patterns may be highly effective in alleviating current maldistribution.

7.2 Health Manpower Initiatives and the Area Health Education Centers Program

Support for health professional education has, until recently, been targeted at programs designed to increase the aggregate supply of health manpower. An implicit assumption of this strategy has been that the pressures of the marketplace would insure an increased penetration of manpower to under-served areas, especially rural and inner-city urban areas. However, despite rapid expansion of the total manpower supply, geographic and specialty distribution continues to be inadequately matched with the needs of the people it must serve. In fact, by some measures the distribution of health manpower -- especially physicians -- has worsened in recent years, and recent reports by Secretary Califano state that increased numbers of physicians lead to greater costs for physician services.[9]

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[9] Eli Ginzberg, "Paradoxes and Trends: An Economist Looks at Health Care," New England Journal of Medicine 26 (1977): 814-6.

Efforts to improve the geographic and specialty distribution of health manpower through educational interventions has taken several forms. Early programs, beginning with Public Law 88-129, the "Health Professions Educational Assistance Act of 1963", were principally aimed at insuring the financial stability of existing institutions and at increasing the aggregate supply of health professionals, although later programs began to direct attention to the issue of distribution (e.g., the National Health Service Corps, authorized under Public Law 90-490). These programs have been notably successful in meeting their objectives.(10)

Despite dramatic increases in supply, health manpower continues to be inadequately distributed. A variety of programs have been initiated at both the state and federal levels to correct these imbalances, including a) the development of new health professional schools, b) the National Health Services Corps, c) support of primary care residency programs, d) support of programs to train a variety of primary care health practitioners, e) support of departments of Family Medicine in existing schools of medicine, and f) support of projects in schools of nursing aimed at correcting maldistribution of nurses. These efforts have been targeted at one or more of the factors which influence distribution identified above. A major effort to intervene in the educational process and to improve the professional environment as well as to provide learning opportunities in selected target areas is through the area health education centers program.

The term "area health education center" (or "AHEC") was first used by the Carnegie Commission on Higher Education in its 1970 report.(11) Addressed primarily to university health science centers and medical schools, this report called for "reform and innovation" in these institutions so that they could more effectively address health manpower and health care delivery problems in their surrounding areas.

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(10) U.S. Senate, Report No. 94-887, "Health Professions Educational Assistance Act of 1976" (to accompany S.3239), Committee on Labor and Public Welfare, 94th Congress, 2nd Session, Washington, May 14, 1976.

(11) The Carnegie Commission on Higher Education, Higher Education and the Nation's Health: Policies for Medical and Dental Education, McGraw-Hill, 1970.

The Commission reported that the United States, in general, faced a serious health manpower shortage which was exacerbated by the geographic maldistribution of manpower (leaving central city and rural areas with the greatest shortages). The Commission viewed medical schools and health science centers as the prime movers for overcoming this problem if these institutions would accept the challenge of shifting their priorities away from further investment in improving the scientific excellence of medical education towards a concern for meeting local health manpower requirements.

The Commission recommended, for example, that health science centers might emphasize the education of allied health personnel, physician assistants, and other auxiliary personnel who would extend the availability and reduce the cost of health services to isolated populations in their surrounding communities. The Commission also recommended shortening the time required to become a practicing physician from eight years after receiving the B.A. degree to six years, in order to reduce education costs and increase physician supply. To provide graduate physicians with a better orientation to the routine practice of medicine, the Commission recommended the improvement and expansion of residency programs in community hospitals. To improve the efficiency of undergraduate medical education, the Commission suggested that medical schools and health science centers adopt the "integrated science model," whereby most or all of the basic science portion (the first two years) of the medical curriculum is provided on the main university campus and not duplicated within the medical school. The Commission further recommended increased opportunities for women and minorities in health professions education. Clearly all of these recommendations implied substantial institutional change on the part of medical schools and health science centers.

As one vehicle to support such change and to allow these institutions to reach out to their surrounding communities, the Commission recommended the creation of 126 area health education centers (AHECs) across the country. In its words:

> Each of these (AHECs) would be at a local hospital. The centers' educational programs would be administered by university health science centers. They would train medical residents and M.D. and D.D.S. candidates on a rotational basis; they would carry on continuing education for local doctors, dentists, and local health care personnel; they would advise with local health authorities and hospitals; they would assist community colleges and comprehensive colleges in training allied health personnel; and, in other ways, they would help improve health care in their areas.(12)

The Commission emphasized that one of the major functions of the AHECs would be to develop new medical residency programs (or improve the quality of existing programs) at their hospitals, since this function could be expected to have great impact in terms of readdressing the geographic maldistribution problem for physicians.(13) Furthermore, the Commission viewed the health science centers, acting through their affiliated AHECs, as taking on "central responsibility for the planning of health manpower education" in the remote areas served by the AHECs.(14) Indeed, the Commission seemed to view the AHECs as the coordinating point for regional systems of health education and health service institutions, overseen and supported by the university health science center.

Under authority of Sec. 774 of Public Law 92-157 the Bureau of Health Manpower Education (now the Bureau of Health Manpower [BHM]) issued a request for proposals in 1972 and contracted with eleven universities(15) for the development of area

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(12) Ibid., p. 6.

(13) Ibid., p. 87.

(14) Ibid., p. 76.

(15) The eleven are Tufts University, the University of West Virginia, the University of North Carolina, the University of South Carolina, the University of Illinois, the University of Minnesota, the University of North Dakota, the University of Missouri-Kansas City, the University of Texas Medical Branch of Galveston, the University of California, San Francisco. Seven of the AHEC contracts are with the medical school and four are with the parent university.

health education centers. The national AHEC program is an educational program which seeks to improve access to high quality health services among people in under-served target areas by increasing the supply and improving the distribution of a broad range of health manpower, especially primary care providers.[16] The program's fundamental premise is that the training of health professionals in remote or under-served areas will eventually improve distribution of health manpower and the quality of care provided in these areas. A major weakness of the program is the lack of a true multidisciplinary concept of health care delivery. The national program has several state-level counter-parts.

7.3 Elements of the AHEC Concept

The AHEC concept is firmly rooted in the fundamental character of professional education, which emphasizes the application of knowledge in the delivery of services. AHEC projects provide community-based educational programs within the context of local health care delivery systems. Because of this location at the interface between education and service, AHEC projects must be sensitive to the contributions and special requirements of both domains.

There are four basic elements of the AHEC concept -- goals and objectives, program, structure, and operations. Each of these must be addressed in the process of defining an AHEC program.

7.3.1 Goals and Objectives

The long-term goals of an AHEC program are to improve access to high quality health services through improvements in the

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(16) This goal statement is most clearly articulated recently in Report No. 94-266 (to accompany HR 5546), by the Committee on Interstate and Foreign Commerce, p. 22ff, and in the responses of the AHEC projects to the question of goal priorities in the Abt Associates study. In that study the eleven projects unanimously identified as high priority goals both: "Increasing the supply of certain types of health manpower in the AHEC area/s," and "Increasing the number of graduates from AHEC training programs of all types who decide to locate in the AHEC area/s for practice." Abt Associates, Inc., "Initial Description of the National Area Health Education Centers Program," Cambridge, Mass.: National Technical Information Service, 1976.

supply and distribution of health care providers and to improve the quality of health services.[17] These goals are to be achieved through educational interventions which address both distribution and quality. It is an assumption of the AHEC concept that professional education plays an important role in health manpower distribution and that education can improve the quality of care.

Within the general educational goals of the AHEC concept there is a special emphasis upon training for careers in primary health care practice. Most observers agree that there is a need for additional primary care providers.[18]

An AHEC program seeks to address this need through special attention to the training of primary care physicians (general internists, general pediatricians, and family physicians), nurse clinicians, general dentists, pharmacists, and other primary care health professionals.

Regional objectives and priorities are defined by the AHEC board of directors, in consultation with their advisory committee. Health science center objectives and priorities must be defined by the participating faculty. The project should encourage and support high quality educational activities which are responsive to both regional and university needs.

7.3.2 Program

The AHEC concept recognizes the advantages of comprehensive solutions to the problems of maldistribution of health manpower resources. Piecemeal solutions to these complex problems have not been effective. For example, efforts to attract physicians to a region are unlikely to be successful unless adequate hospital facilities and nursing and auxiliary services are available, and unless acceptable referral and consultation networks can be developed.

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(17) D. I. Zwick, R. Walkington, D. R. Smith, and G. M. Stiles, "A Report on the National AHEC Program," Public Health Reports, Vol. 92, No. 2 (March-April), pp. 108-120, especially p. 118; see the 'Approaches and Issues' paper pages 13-14.

(18) Iglehart, J. K., "Health Report/Maldistribution of Physicians is Focal Point of Manpower Debate," National Journal Reports, June 8, 1974, p. 837.

It is essential, therefore, to provide a comprehensive range of educational activities, both by discipline (dentistry, medicine, nursing, pharmacy, and allied health) and by level (undergraduate, graduate, and continuing).

The diversity of needs and resources in an AHEC target area makes any rigid and uniform educational program inappropriate. The variety of educational activities must be selected to meet both local and university requirements. In general, however, each participating AHEC will be expected to participate in community-based educational experiences for health science center students (especially in primary care fields), in graduate medical education (either through the development of local residency programs or through rotations from the health science center), and in continuing and in-service education for local health care professionals.

Decentralized health professions education differs from that offered at the health science centers both by place and by kind. Health science center students participate in AHEC sponsored programs because the health sciences faculties believe that these experiences offer significant learning opportunities. Exposure to community care-giving systems complements the health science center curricula. Of course, the faculties retain full responsibility for the educational criteria for community-based programs.

The AHEC projects have a special responsibility to help meet the needs of regional health education programs. Examples of the kinds of activities which might be included in this category are the training of emergency medical personnel, assisting in the strengthening of local nursing and allied health programs, and providing for the educational needs of National Health Service Corps personnel. The AHEC concept encourages close cooperation between the AHECs and regional health manpower educational efforts. Upon invitation, the AHECs must be prepared to respond to appropriate requests for assistance.

Specific details of the educational program are to be negotiated annually for inclusion in the Scope of Work. Subject to the availability of resources, local priorities are to be

established by the AHEC. It is expected, however, that the AHEC will carefully consider the educational needs of all health professionals in the target region and will support a balanced program which is responsive to regional needs.

7.3.3 Structure

An AHEC program is based upon a voluntary partnership between participating units of the health science center and the health care and educational institutions of the target area. Because the program is institutionally-based at both the health science center and in the target region, accountability is enhanced. The voluntary nature of the program promotes cooperation among the participants.

As it was first articulated by the Carnegie Commission, the AHEC concept implied an hierarchical relationship between the health science center and the regional affiliate. For example, the Commission wrote that "...area health education centers, in essence, would be satellites of the university health science centers...Their educational programs would be developed and supervised by the health science faculty, and their patient care functions would rely on the expertise of the health science center personnel."[19] In practice, however, this superordinate - subordinate relationship has proven unsatisfactory and has been replaced by a partnership arrangement.

Implicit in the idea of partnership is the assumption that both the health science center and the regional communities have important contributions to make and that both will agree to share their resources in order to achieve their common goals. Health science center faculty must retain full authority over the educational programs while regional participants must retain control over their patients and the delivery of health care. The integrity of both education and service must be respected and protected.

The health science center participants may involve entire schools, departments or divisions, or individual members of the

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[19] Carnegie Commission, op. cit., p. 55, Emphasis added.

faculty. A variety of mechanisms is available to provide coordination of effort among the participating units; a decision on a specific administrative mechanism will depend upon the degree of involvement and upon local conditions. Usually the deans of all participating schools (or their designees) will jointly decide issues of educational policy.

The community is represented in the AHEC program by one or more accredited hospitals which agree to sponsor a regional AHEC project. A foundation is established as an organizational framework for the project. The corporate charter and the by-laws of the foundation will specify the goals and objectives, the management, and the target area for each project. The by-laws usually provide for a regional advisory committee, which is broadly representative of community interests and the health professions in the target area.

An AHEC program must be open to the participation of all health care and educational institutions in the target region. In general, sponsoring hospitals should be of sufficient size and resource base to support a full array of educational programs, including residency programs. Sponsoring hospitals must also agree to assume the leadership for the development of a project to serve a multi-county area.

7.3.4 Operations

The community hospital-health science center partnership which is the foundation of the AHEC program must recognize that important differences exist between the partners. The primary goal of the community hospital is the delivery of high quality health services; education is a secondary consideration. The primary goal of the health science center is education; delivery of health services is a by-product of clinical education.

Although they are different, education and service are not incompatible goals. An active educational program, supported by the health science center faculty, can improve the professional practice environment in target communities and directly affect the service delivery system. Similarly, exposure to the care-giving

systems in places away from the health science center and learning which takes place in these community settings can be an important part of the educational experiences of health science center students.

The AHEC program must respect both of these important and complementary goals. The program should build a community-based educational program upon the foundation of a regional health services delivery system.

Representatives of the health science center and the community meet annually and agree upon the activities to be undertaken by the AHEC during the year. These agreements are formalized in a Scope of Work, which will specify the annual program. Funding for the regional AHEC is through a cost-reimbursable contract linked to the items in the Scope of Work.

Consistent with the partnership arrangement of the AHEC project, only those activities which are mutually desired by the community and the university are to be included in the Scope of Work. Participation by local institutions or professionals (and their patients) is always strictly voluntary. Final review and approval of the annual Scope of Work will be the responsibility of the board of directors of the AHEC and of the program director. Specific details of the Scope of Work will reflect the needs and capabilities of both the community and the university.

Regional faculty play a key role in the operation of an AHEC program. These faculty may be employed either full-time or part-time, or they may be voluntary. Regardless of their employment status, regional faculty should be recruited in accordance with normal university procedures; as members of the health science center faculty they should be expected to participate fully in department and school affairs.

The regional director, on the other hand, is not a regular member of the health science center faculty. As the administrative head of the affiliated program, the AHEC director must be solely responsible to the local board of directors. In many cases, however, regional directors are made "clinical" or "adjunct" members of the health science center faculty, when this is appropriate.

This distinction between the roles of the regional faculty and the regional director reflects the administrative and educational dimensions of an AHEC program. Administratively the program, including the central office and all non-faculty in the regional projects, provides an organizational framework within which educational activities may be conducted. This administrative component will include budget, space, learning resources, program evaluation, and other necessary support elements.

The educational component, including curricula, student selection, educational evaluation, etc., is the exclusive responsibility of the faculty. Unlike the relatively fixed administrative component, the educational component of an AHEC program may be constantly changing to meet both university and regional needs. In order to avoid confusion over responsibilities and authority, it is important to clearly maintain this distinction between the administrative framework on the one hand and the educational activities which take place within and through that framework on the other.

7.4 The Influence of Area Health Education Centers

Interventions in problems which are as deeply rooted as the issues under consideration here may be expected to take considerable time before showing results. This is especially true of ameliorative programs such as the AHEC concept which address a problem indirectly, through education. It is, therefore, premature to expect definitive results from the AHEC programs.

There is, however, a developing body of literature which indicates that AHEC programs may be having a significant impact on the problems against which they are targeted. The influence of area health education centers is being felt and assessed on these topics -- distribution, quality of care, and education. As in any complex, multi-causal system, these initial results must be interpreted with caution.

Improvements in the geographic distribution of health manpower which coincide with the development of an AHEC (or AHEC-like)

program have been noted in several states. In Indiana the state-wide Medical Education Program has been credited with major responsibility for a significant increase in the physician/population ratio. Analysts in Illinois cite the AHES (area health education system) as the prime factor in increased retention of Illinois medical school graduates into local residency programs; it is assumed that the practice locations of these resident physicians will generally be near the place of their residency training. In North Carolina dramatic improvements in the physician/population ratio (especially in rural counties) has accompanied the development of the AHEC program.

It is more difficult to judge the impact of AHEC programs on specialty distribution. In large part this is because of the difficulty of disentangling the AHEC influence from broader national trends which have recently seen a dramatic rise in the choice of primary care careers. It may well be that in the area of specialty distribution, the contribution of an AHEC program is to solidify and/or re-affirm prior choices.

The impact of an AHEC program on the quality of care is even more difficult to measure. Because of the highly personalized and specific nature of the data it is likely to be a long time before any sound conclusions can be drawn. There does exist, however, some fragmentary yet illustrative evidence which bears on this question.

Many observers believe that the mere presence of health science center faculty has a salutory effect on the quality of care.

The Tufts/Maine AHEC has documented changes in physicians behaviors in ordering laboratory tests during and after extended visits by the health science center faculty and residents to smaller hospitals. And AHEC faculty members can supply considerable anecdotal evidence that their programs have contributed to improvements in the quality of care provided in community settings.

There is much less uncertainty about the impact of AHEC programs on health professions education. This issue has been

examined in a number of contexts and there appears to be no informed disagreement that the quality of education in AHEC programs is at least as good as that offered at the health science center. In a recent article, Polk described the development of community-based electives in surgery at the University of Louisville School of Medicine through the Kentucky AHES program.[20] Using both standardized test scores and faculty assessments, he found no significant differences between students trained at the medical center and those trained in regional community hospitals.

Perhaps the most definitive evaluation of education in an AHEC program has been done by Talbert and his colleagues at the University of North Carolina.[21] They have explored the issue on a number of dimensions and in several different regional settings. As in the Kentucky program, the North Carolina investigators were unable to find any significant differences.

The important educational benefit of an AHEC program, of course, does not lie in its ability to re-create the university teaching hospital environment in remote sites. Rather, it is found in the alternatives which it offers to the academic center in terms of patients, practice settings, care-giving systems, faculty, etc. Many health science center faculty believe that the kinds of educational experiences which are available to their students through an AHEC program add important dimensions to the students' training. In the final analysis it is this belief in the educational validity of the concept which constitutes the most significant evaluation of all.

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(20) Polk, H.C., Jr., "Can AHEC Really Influence the Distribution of Physicians," Journal of Medical Education, Vol. 52, August, 1977, pp. 633-638.

(21) Friedman, C. P., F. T. Stritter, and L. M. Talbert, "Evaluation of a Decentralized Clinical Clerkship," Office of Medical Studies, University of North Carolina, n.d.

In summary, the initial evidence suggests that the area health education center concept offers an effective mechanism of intervention into the problems of health manpower distribution. Many observers believe that AHEC programs are having a positive impact on the quality of health care delivered in target areas. And these gains can be realized with no reduction (some would say with an improvement) in educational quality.

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